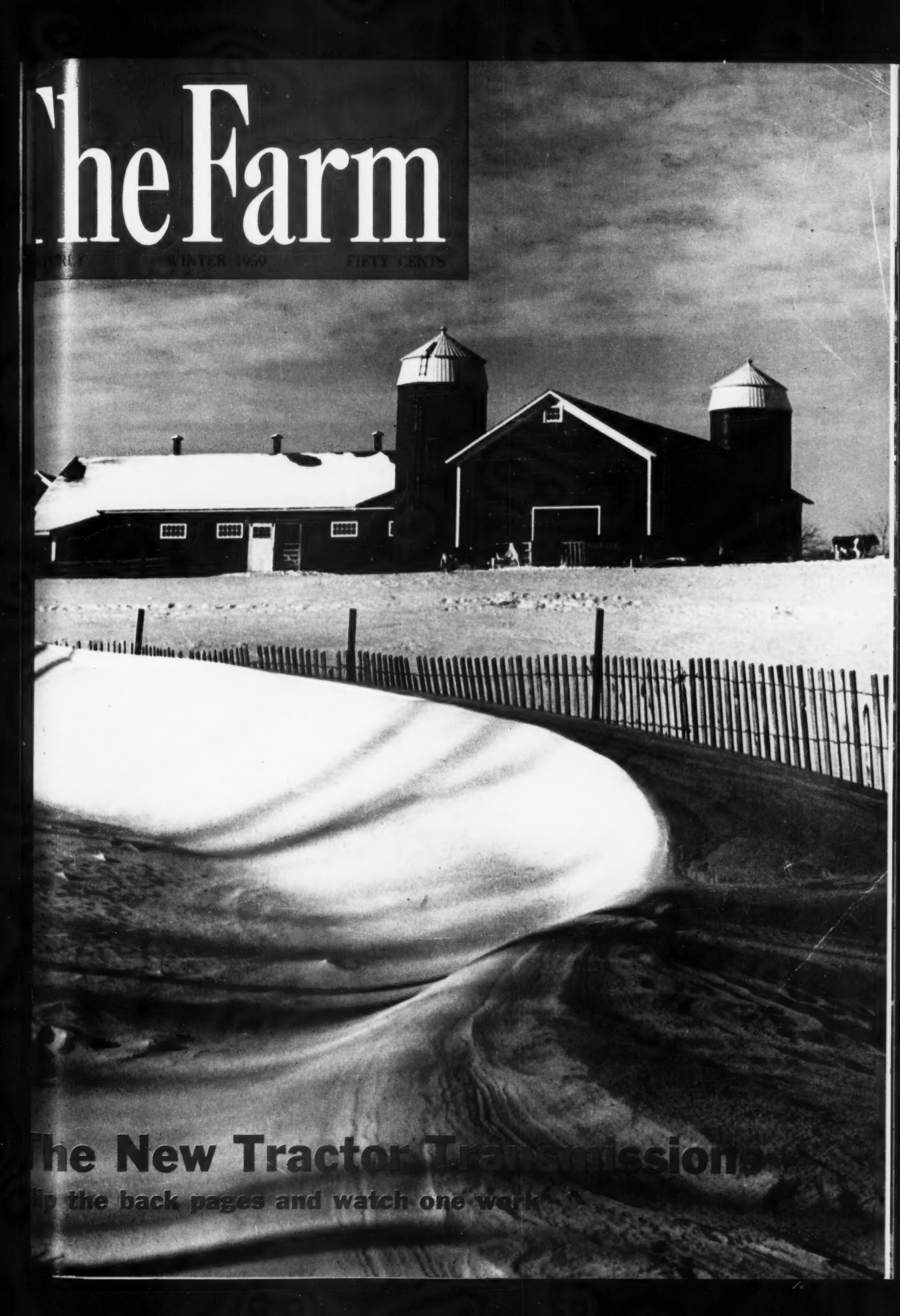

The Farm
WINTER 1959
FIFTY CENTS
The New Tractor Transmission
Flip the back pages and watch one work

This nearby Goodyear dealer sign means better tire values—better tire care—convenient credit terms.

Proved on the toughest jobs on earth—

Triple-Tough 3-T Cord *now helps new* Traction Sure-Grip

deliver strongest traction—longest!

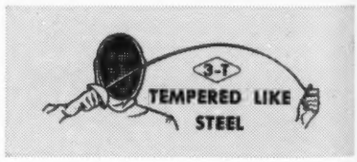
Sure-Grip—T.M. The Goodyear Tire & Rubber Company

Record-breaking endurance on giant earth-moving machinery, on mammoth trucks, on high-powered cars—has proved TRIPLE-TOUGH 3-T CORD to be *the greatest tire saver in 23 years.*

And now its advantages are yours in the new TRACTION SURE-GRIP – world's "workin'est" farm tractor tire!

Bruise problems and crack problems become rarities; treads gain time-saving, fuel-saving, long life—and tire bodies stay in much better shape for farmers who have their tires recapped.

See the new TRACTION SURE-GRIP at your Goodyear dealer's – and remember: *only Goodyear tires have TRIPLE-TOUGH 3-T CORD!* Goodyear, Farm Tire Dept., Akron 16, Ohio.



Like steel, tire cord must be *tempered* to be tough. Goodyear's exclusive 3-T process, involving Tension, Temperature and Time, *triple-tempers* cord to make it TRIPLE-TOUGH—to give you longer tread and tire life, lower final cost!

60th Anniversary

GOODYEAR

More farmers prefer Goodyear Tractor Tires than any other kind

TRACTION SURE-GRIP FARM TIRES

"WHEREVER CROPS GROW, THERE'S A GROWING DEMAND FOR JOHN DEERE FARM EQUIPMENT"

each New Season

finds still more farmers switching to John Deere Tractors

At Winter's end, every Spring finds more "Green" on the landscape – evidence that more and more farmers everywhere are discovering the short-cut to low-cost farming operations.

The delivery of every new John Deere Tractor marks the beginning of new savings in the way of lower operating costs, new ease and convenience over acre after acre, plus insurance of a better job all the way.

It's just the trend – and you're probably noticing it in your vicinity – the trend to "go with the Green – to go John Deere."

JOHN DEERE
MOLINE, ILL. • Dept. Z-54

PUT YOURSELF IN THE PICTURE . . .

Enjoy the feeling—as does this proud family with their new "730"—of owning the most modern in farm tractor power. Enjoy the benefits in more work per hours, less cost per acre, less strain on you, and bigger profits.

Farm Quarterly, Vol. Thirteen, No. Four. Editorial, Circulation and Executive Offices, 22 East 12th Street, Cincinnati, Ohio. Published quarterly by F. & W. Publishing Corp. Subscription price 50c a copy; $2.00 for one year; $3.50 for two years; $5.00 for three years. Add $1.00 per year extra for rates outside the United States and Canada. Entered as second-class matter at the Post Office, Cincinnati, Ohio, under the Act of March 3, 1879. (Title Reg. U.S. Pat. Off.)

Step into this New World of Power!
Now, plow up to 30 acres a day . . . roll down the road at 16.6 mph with this great new 5-plow, 6-row Farmall 560 tractor! This big 6-cylinder 560 is the "flagship" of a great new line of Farmall and International tractors. These years-ahead tractors give you the widest choice of models and power options ever offered—in 10 to 60 hp sizes!

Now! The greatest FARMALL® of them all!

You're rollin' at 5 mph plus . . . in third gear! Past experience tells you this is planting speed, but you're plowing—deep and clean! Tough spots seem to disappear when you're on this new 5-plow Farmall® 560. And you're in for another new thrill. Super-smooth, all-new 6-cylinder engine ends the ear-jarring roar and arm-numbing vibration, common to big tractors under full power, that used to tire you out by midday.

This new IH Multi-Range six delivers working power over the widest governed range of any big tractor—600 to 1,800 rpm! Teamed with 10 speeds forward, this gives you unequaled power-speed flexibility, and amazing economy from ½ to over 16 mph!

60 hp* was never so easy to control! Relax in the deep-cushioned seat. Oversee your work with a light touch on close-by controls. Turn short with effortless

ease, but retain firm, safe feel with new IH power steering. Say goodbye to shimmy at any speed. See how all-new, more powerful hydraulic system speeds big implement control. And notice how lever position of new Tel-A-Depth indicates precise depth of Fast-Hitch implements. Just set the Traction-Control lever to add up to a ton of weight that *constantly* matches traction to the load.

Try all the other IH farm-easy features, like Torque Amplifier, Fast-Hitch, and independent pto, in the new 5-plow Farmall 560 . . . or its feature twin the 4-plow, 50 hp* Farmall 460. Get the same big power with gasoline, Diesel, or LP gas engines.

You're a bigger man on any new Farmall or International® tractor. Just call your IH dealer for a field trial that shows why. Set a date, today.

**Estimated belt hp. Not officially tested.*

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International Harvester Products *pay for themselves in use*—Farm Tractors and Equipment . . . Twine . . . Commercial Wheel Tractors . . . Motor Trucks . . . Construction Equipment—
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ANIMAL HEALTH ENGINEERING
as practiced by
YOUR VETERINARIAN

"For every dollar a livestock owner invests in veterinary services, it is estimated he gets a return of $5.78 on his investment*", says Dr. C. D. Van Houweling, Agricultural Research Service, United States Department of Agriculture.

WHETHER YOU OWN LIVESTOCK FOR MEAT OR MILK, an investment in Animal Health Engineering, as practiced by your veterinarian, pays tremendous dividends. This has been proved again and again by progressive livestockmen in every section of America.

HEALTHIER ANIMALS, HEALTHIER PROFITS. Animal Health Engineering is the all-inclusive program your veterinarian uses to help you keep your animals at the peak of their health and productivity. Through this program, he "watches over" the physical condition of your livestock. Each time he calls, all the resources of modern veterinary science call with him.

TRAINING, EXPERIENCE, SKILL. When your veterinarian examines your animals, his practiced eye is searching for warning symptoms of disease – profit-robbing disease that may run through your entire herd unless quickly recognized and brought under control.

He brings to your farm or ranch the most advanced techniques of disease prevention, diagnosis, treatment and surgery. He's your private "answer man" for the thousand and one questions which continually arise concerning animals, their nutrition and care. *If you raise livestock for meat, ask him about the 3 remarkable new Synovex balanced hormone implants – one for steers, one for heifers, one for lambs – which improve weight gains and feed conversion up to 20%.*

NEW KNOWLEDGE, NEW DRUGS. When disease strikes your herd, your veterinarian treats them with the most modern methods and the newest, most effective drugs. Perhaps he may choose a drug produced by E. R. Squibb & Sons. When he does, you can be confident there is no finer, more potent, more thoroughly tested drug of its kind available anywhere today. Remember SQUIBB – A NAME YOU CAN TRUST.

E. R. SQUIBB & SONS, *Veterinary Department*
745 Fifth Avenue, New York 22, N. Y.

*Figures based on a study made by the Veterinary Services Committee of the American Veterinary Medical Association.

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New muscles at your command:

OLIVER'S FOUR BIG POWERS

It's more than added horsepower—far more. It's the way Oliver harnesses this new engine power to make it more flexible, more practical, more usable in every way:

1. POWER-BOOSTER DRIVE, on the 770 and 880, brings you emergency power at the flick of a lever...ends repeated clutching and shifting. Power-Booster Drive actually doubles your working speeds, gives you 12 forward speeds in all!

2. POWER-TRACTION HITCH produces a bear-down action when the going gets rough...automatically throws more weight onto your rear wheels...pulls you through without slippage. Fast hitching of all 3-point tools, new semi-mounted plows.

3. "HYDRA-LECTRIC" POWER CONTROL. Only Oliver brings you the versatility of smooth, powerful "Hydra-lectric" (patented) which takes 95% of the work out of implement control. And see the 550 (below) equipped with its automatic draft control.

4. INDEPENDENTLY CONTROLLED POWER TAKE-OFF. An Oliver "first," it's still an Oliver "best"—a direct drive, completely independent of the traction clutch. *But try these power features firsthand...put these muscles to the test...*

See Your *OLIVER DEALER* and See

or write: The Oliver Corporation, 400 W. Madison St., Chicago 6, Ill.

2 TON LITTER...

IN 5 MONTHS 7 DAYS!

Below: At 99 days, 2,049 lbs.

Left: Off to market at 5 months 7 days, 4,005 lbs.

Joe Armstrong, Princeton, Indiana, who raised this litter to 1 ton in 99 days, has added another chapter to the amazing story of his 19-pig record-making Crossbred litter. Over two tons of pork in just over 5 months, under practical farm hog feeding conditions...using the regular Wayne program.

Total feed cost, farrowing to market, including grinding and mixing charges, totaled only $411.82. Marketed at just under 211 lbs., the feed conversion averaged 2.8 and cost per pound of gain was 10.28¢.

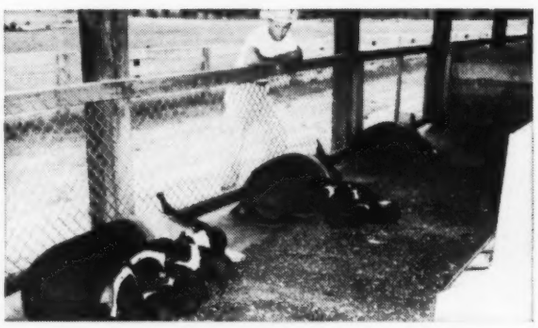
This litter grew to record weight on a program of Wayne Calfnip Milk Replacer, Tail Curler Rockets, Tail Curler Jr., Pig Balancer, Res-Q Diet, Hog Balancer, and corn. All are available to you at your local Wayne Feed Dealer.

SOUTHERN FARMER RAISING 5,000 HOGS A YEAR ON CONCRETE

Using the Wayne "complete feed" program of Tail Curler Jr., Tail Curler, and Hog Developer to 100 lbs. and then Wayne Hog Balancer and shelled corn to market weight, the Crawford and Simpson Hog Farm, Flora, Mississippi, shows a cost of gain of only 13¢ a pound, including sow's feed.

An assembly line farrowing and feeding system is carried out in converted wartime ordinance buildings. Pigs are weaned at 6 weeks, sorted for size and moved into growing sheds . . . at 100 lbs. they're heading for the finishing sheds. Concrete floors make sanitation easy. Confinement growing allows closer tending and supervision. Crawford and Simpson are convinced that they're on the right track with good management and the reliable Wayne Hog Feeding Program.

Ask your Wayne Dealer for the Pig & Hog Feeding Programs that can help you increase pork profits!



Robert Willis, herdsman, looks over three litters in the clean, concrete floored farrowing shed.

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ALLIED MILLS, Inc.

Builders of Tomorrow's Feeds . . . Today!

Executive Offices: Chicago 6, Ill.
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Smileage!

9 out of 10

users say:

"B.F.Goodrich farm tires are the best I've ever used!"

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"B.F.Goodrich Dual Ring tires reduce shimmy, steer easier"—Robert Reynolds, Mt. Vernon, Ohio.

"Special Service tires give greater traction, climb levees easier"—William Schrock, Almyra, Ark.

Take the word of hundreds of B.F.Goodrich tire users all over the country. 9 out of 10 of them say B.F.Goodrich farm tires are the best they've ever used! It will pay you to see your B.F.Goodrich dealer today. He's listed under Tires in the Yellow Pages of your phone book. *B.F.Goodrich Tire Company, A Division of The B.F.Goodrich Company, Akron 18, Ohio.*

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farm tires

The Farm QUARTERLY

Winter, 1959, Volume 13, No. 4

CONTENTS

LIVESTOCK

A. I. on the Range 44
What Price Hogs? 76

BUILDINGS AND EQUIPMENT

Toward Push-Button Stock Raising 66
The New Transmissions 68

MANAGEMENT

Should I Buy Land? 42
Production Per Stall 48
Feeding Wet-Weather Forage 74

CROPS

Birdsfoot Trefoil 46
Chemical Nurse for Legumes 47
No Surplus in Sugar Beets 58

SOIL AND CULTIVATION

Irrigation from Below 52

FEATURES

Integrated Norse 36
Bundling, the Gentle Art 56
Rolling Hills and Rugged Cattle 62
Christmas on Dutch Fork 72

DEPARTMENTS

Letters 14
The Dairy Barn 16
Farm Books 18
Over the Back Fence 26
The Last Word 28
The Farm's Pictures 131
Index to Advertisers 133

THE FARM QUARTERLY

22 East Twelfth Street, Cincinnati 10, Ohio

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Get the full value from high-priced land, seed, fertilizer and water.

Try Soil Engineering with CAT Equipment...

Soils and crops men often find the missing link between fertilizer, water and high yields is *soil engineering!* They've pretty definitely shown that your ground may be loaded with nutrients and water, but if your soil isn't right, your corn yields won't get up much above 80 bushels, nor cotton yields over a bale per acre. Your limiting factors may be drainage, soil texture, topography, profile, depth of topsoil, character of subsoil and many other soil problems.

It is frequently possible to correct these problems *mechanically*—this is the function of soil engineering. For example, it may include every phase of land development from clearing off patches of trees or filling in gullies that cut up your fields, to blending different types of soil to mechanically produce just the right seedbed for your crops and climate.

Obviously, these jobs call for greater power, efficiency and economy than wheel-type farm tractors can muster.

But getting the most from your soil, seed, fertilizer and water is within your practical reach. There's a Cat Diesel Tractor and matched equipment to exactly suit your farming plans. You can go into full time or spare time land development on your farm. You can bulldoze and scrape off the crowns of the hills, fill in the low spots. Subsoil to facilitate drainage and deepen your crop root feeding zone. Build drainage and irrigation ditches—and erase them, too, at will. Clear off pesky hedgerows. Eliminate irregular shaped fields.

Just as important, with an all-purpose Cat Diesel Farm Tractor, you can handle all these jobs—and then switch immediately to general farm work. Once again, the extra power, traction, economy and long life of a Cat Diesel Tractor pay off in terms of more work accomplished, more money for you.

Your Caterpillar Dealer will gladly help you select the right tractor for your farm. Name the date—he'll demonstrate!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U.S.A.

Cat D4 Tractor has 50 DBHP. Pushes or pulls 10,700 lb. —⅓ again as much as most 50 DBHP wheel-type tractors. Burns low cost fuels. Handles 5 to 6 bottoms.

Cat No. 12 Motor Grader has 115 HP. Every practical ditching and blade leveling position can be easily, accurately and positively made from operator's seat.

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☐ Send me "Soil and Water Conservation."

I farm_____acres. Am interested in a_____tractor.

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CATERPILLAR

TRACTORS • TOOL BARS
TOOLS • ENGINES
EARTHMOVING EQUIPMENT

"FIRESTONE FREE LOANERS KEEP MY TRACTOR ROLLING WHEN EVERY MINUTE COUNTS!"

says Harry Andreesser, Parkersburg, Iowa.

Firestone Dealer W. W. (Smitty) Smith (right) and Horace Sheridan (center) mount a pair of "free loaners" in minutes right in the field for Harry Andreesser.

Butler County, Iowa, farmers—like farmers everywhere in the country—can't afford to have tractors stand idle while worn tires are retreaded or repaired. Harry Andreesser keeps his tractor working without tire delays by using new Firestone *Free Loaner* tractor tires.

"W. W. (Smitty) Smith, my Firestone Dealer in Cedar Falls, lets me use brand-new Firestones for nothing when he retreads or fixes my old tires," Mr. Andreesser says. "He puts them on right in the field to keep my tractor rolling during the busy days when every minute counts. That's the kind of service I really appreciate."

Firestone's *Free Loaner* Service is just one of many reasons farmers look to Firestone for farm tires. Another reason is that Firestone Rubber-X is especially compounded for farming conditions to add new strength and extra wear to farm tires.

Visit your Firestone Dealer or Store and find out how Firestone Rubber-X and exclusive S/F (Shock-Fortified) cord help make Firestone farm tires last extra long. Ask about the new All Traction Champion* tractor tire. And check on Firestone's *Free Loaner* Service.

Enjoy the Voice of Firestone on ABC television every Monday evening.

*T.M.

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Firestone

BETTER RUBBER FROM START TO FINISH

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Trade up to NEW IDEA

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NEW IDEA power spreading costs you less than automatic transmission for your car

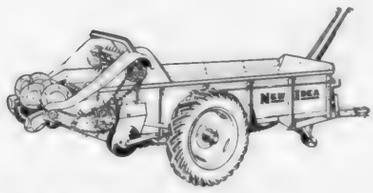
Now, shift to power spreading with a NEW IDEA.

NEW IDEA PTO spreaders, with their big tires, let you spread in wet, icy weather . . . on soft, slippery fields . . . over hilly terrain. Built to spread efficiently every day of the year.

You handle bigger loads. You save yourself time and labor. With NEW IDEA you have five spreading rates for each forward tractor speed plus throw-out clutch for easy cleanout and pile unloading . . . all controlled from your tractor seat.

Which power spreader is best for you? NEW IDEA offers the big 95-bu. PTO spreader for average farms . . . the giant 125-bu. PTO spreader with forage box sides available, for large feeder and dairy operations. Famous NEW IDEA ground-driven spreaders available with 70-bu., 75-bu.. or 95-bu. capacity. You can buy any NEW IDEA spreader with new or used tires. Best and most complete line of spreaders on the market today. Full year guarantee on every one.

Remember, more farmers buy NEW IDEA spreaders than any other make. Let your NEW IDEA dealer show you why.



NEW IDEA Spreaders

SHRED FINER

SPREAD WIDER

LAST LONGER

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The truck with the *MOST!*

New 1959 Dodge

BIG BUY of the low-priced three!

This is your year to switch to a Dodge truck—the *low-priced* truck that gives you everything! A truck that snaps into action with the spirit and agility of a mustang! A sleekly styled, easy-riding truck with a tough 205-hp. power plant . . . loads of load space . . . and all *at a low price that says,* "Buy!" Choose a size to suit . . . from this new Sweptline up to 49,000-lb. G.V.W. Power Giants. Your new Dodge is the truck with the ***most*** in the low-priced three!

Today, it's real smart to choose

DODGE TRUCKS

"Our DARI-KOOL Has Operated 4 Years Without A Service Call!"

Write MR. & MRS. HARVEY HAGENOW
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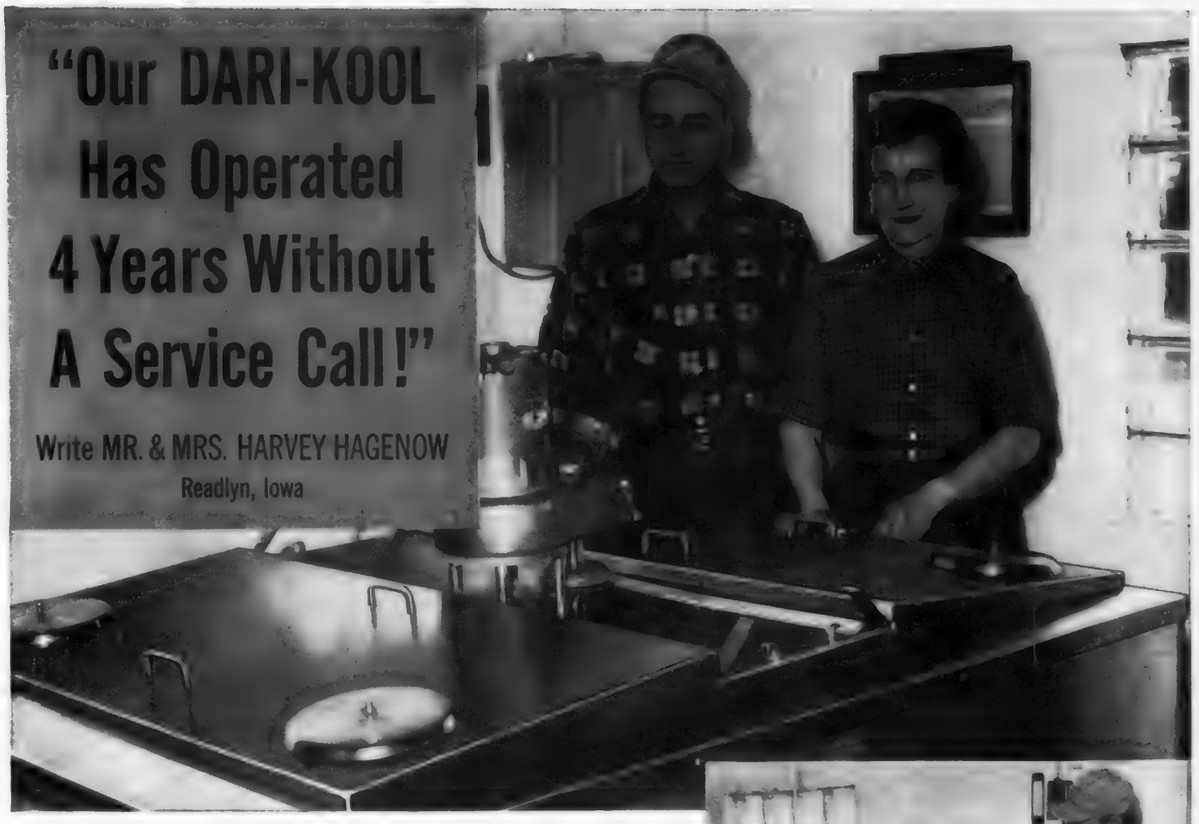

"We have had our bulk tank for almost four years and we are certainly glad we chose a Dari-Kool tank. We feel there isn't anything better than stainless steel for the outside as well as the inside of a bulk tank. It is very easy to clean and always looks just like the day we installed it. In the four years we have had our Dari-Kool we have never had to have a service call. It has been trouble-free, and we are sure it will continue to be for many more years."

(signed)

Mr & Mrs Harvey Hagenow

Mr. Hagenow's tank is on E.O.D. pick-up. It is filled to capacity on pick-up day. Dari-Kool's 2-speed agitator provides ideal milk agitation. The slow speed is used during the cooling cycle; the high speed for composite sampling.

Model shown DKS 200 (200 gallon capacity) Available in 190 to 1000 gallon capacities.

The ICE BANK COOLER that Outperforms and Outsells them all!

DARI-KOOL MEETS ALL 3A STANDARDS

DARI-KOOL
BULK MILK COOLER

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MILKHOUSE PLAN KIT

Arrange scale model cutouts of bulk tanks, water heaters, wash sinks, etc., on graph sheet to fit your plan.

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Manufacturers of KARI-KOOL Truck Tanks

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Wishful thinking or thoughtful planning, this young citizen has the right idea. Since he's dreaming, his vision contains the best of everything, including the Peerless Pumps. In daily use on thousands of farms throughout the country, their top design, longer, more productive life, less need for maintenance, and sensible initial cost have made them truly the American farmer's favorite. See your Peerless Dealer soon. He'll be glad to show you how Peerless can be a big, profitable part of your future, too!

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Please send me these Peerless Brochures:

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Name_____

Address_____

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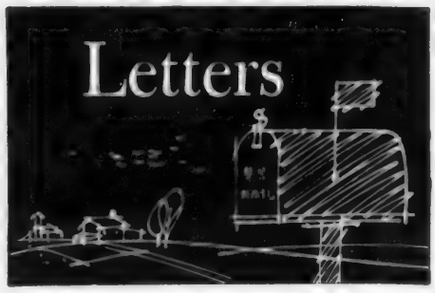

The New State

Sirs:

Your article, "Alaska Stockman," has been read with much interest by various members of the University of Alaska Cooperative Extension Service and by many persons in Alaska in the past few weeks, I have been a reader of THE FARM QUARTERLY for the past several years prior to coming to Alaska and I find it stimulating and an interesting publication. I was very interested in your article on Mr. Mercer and his stock raising enterprise at Lignite as I have met Mr. Mercer and have followed his project with great interest.

Certainly the courageous enterprise of the young Mercers is to be commended. They are examples of the pioneering type of hardy folk who are paving the way for other larger enterprises in the future of our new state.

John P. Thomson
U. S. Department of Agriculture
University of Alaska, College, Alaska

Sirs:

Permit me to congratulate you on your very excellent article, "Alaska Stockman," which I found most informative and exciting.

I would like to know whether you think the Mercers would care to hear from persons here in the States. If so, would you please send me their address. I would enjoy corresponding with them and learning more about their experiences. It surely would be a wonderful thing to see that part of the world some day.

Albert R. Kozak
Rose Hill, Mississippi

Write to Mr. and Mrs. Berle Mercer, Lignite, Alaska.

Russell Roundup

Sirs:

We have just seen the magnificent article entitled "C. M. Russell, Cowboy Artist" by George Laycock, which appears in your splendid Autumn, 1958 issue. Although other important magazines have done articles of this nature in recent years, this, to the best of my knowledge, is the finest thing published on Charles M. Russell in magazine format in the past decade. You and your magazine should certainly be complimented for such a superb job.

As you may know, we of the Historical Society of Montana are indeed proud of the fact that we own the largest single collection of original Russell art in existence. I think it would interest your readers to know that a very large part of Charles M. Russell's paintings have been reproduced in the past half century and that we pride ourself in making most of these available at very nominal prices to people who, of course, cannot own an original Russell but who admire his work so much. In any event, I want to thank you and compliment you on the wonderful job you have just done.

Michael Kennedy
Acting Director
Historical Society of Montana
Helena, Montana

Don't Mark Martin Down

Sirs:

Why no mention of Martin Steel silos in the otherwise thought-provoking article entitled

(*Continued on page* 130)

Destination Anywhere...

...and PIPER puts you there with speed, style and safety

Wherever you're heading – to town for shopping . . . back to school with the youngsters . . . a state or two away to an auction . . . to far away holiday places – you'll get there easily, safely . . . with surprising economy . . . in your Piper.

From sturdy utility two-seater Super Cub to luxurious twin-engine Apache, the Piper line fills every type of farm and ranch requirement.

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Flying farmers and ranchers the world over are doing business more profitably . . . extending their pleasure horizons . . . in super-reliable planes built by Piper. The complete new line of Piper planes includes many advanced features that will interest you—whether you already own an airplane or have yet to discover the advantages a plane will offer you.

Why not send today for details of these Piper planes?

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SUPER CUB. Workhorse for farm and ranch chores. Takes off, lands in 50 yards. Carries two in tandem seats, cruises 110 mph. PA-18-A agricultural model is world's most widely used plane for dusting, spraying.

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TRI-PACER. World's most popular four-passenger plane. Combines most features to simplify flying. Cruises over 130 mph, has range over 500 miles, can carry 600 lbs. of freight. Ideal as farm plane.

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Your Piper is just as convenient as your car, since any level pasture or strip – 100 to 200 feet wide, 1,500 to 2,000 feet long with clear approaches – provides adequate landing facilities.

LEARNING TO FLY IS EASY

You'll find learning to fly easy, whether you take individual lessons from your Piper dealer by the hour or follow Piper's "Learn as You Travel" program. Your Piper dealer will teach you to fly FREE in your own Piper.

COMANCHE. New, high-performance, roomy, four-passenger, all metal plane with retractable tricycle landing gear and many advanced aerodynamic features. Available with 180 or 250 horsepower.

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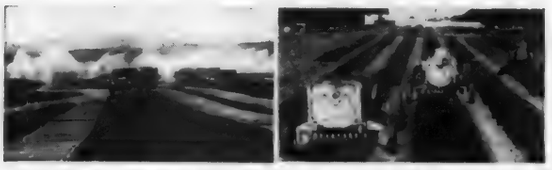
MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

*20 MILLION TREES A YEAR!

*NOW OVER 35 MILLION!



YOUR IDLE LAND CAN PAY YOU A HANDSOME PROFIT!

Plant Christmas Trees and Timber Crops

Good trees pay dividends. Inferior stock costs money. Selected seed from good parent stock produces good trees. Scientific methods of propagation and planting make more roots. Heavy roots mean rapid growth. Musser trees grow and thrive where others may fail to survive.

SEEDLINGS and TRANSPLANTS at LOW, QUANTITY PRICE

	500 at 1000 rate	Per 100	Per 1000
SPECIAL STRAIN SCOTCH PINE Very best Christmas Tree strain. From seed collected by our men from selected parent trees. Healthy, sturdy, straight stemmed, rich color.			
2-yr. Seedlings, 3-6"		$ 5.00	$ 25.00
2-yr. Seedlings, 4-8"		6.00	30.00
4-yr. Transplants, 8-12"		20.00	100.00
AUSTRIAN PINE			
2-yr. Seedlings, 3-6"		$ 5.00	$25.00
3-yr. Seedlings, 8-14"		9.00	45.00
NORWAY SPRUCE — Fast growing Seed collected by our men from selected trees.			
2-yr. Seedlings, 5-10"		$ 7.00	$35.00
3-yr. Transplants, 6-12"		13.00	65.00
DOUGLAS FIR — Hardy			
2-yr. Seedlings, 5-10"		$ 7.00	$35.00
3-yr. Seedlings, 8-12"		11.00	55.00
BLUE SPRUCE — Superior stock			
3-yr. Seedlings, 4-8"		$ 9.00	$ 45.00
4-yr. Transplants, 4-8"		18.00	90.00

Write for FREE CATALOG...

and wholesale price list. Ask for our Famous Christmas Tree Growers' Guide.

Many other Evergreens, Hardwood, Ornamental and Shade Trees

MUSSER FORESTS, INC. BOX 6-L INDIANA, PA.

DURING THOSE WINTER EVENINGS BY YOUR FIRE PLACE

Think!
Study!
Evaluate!

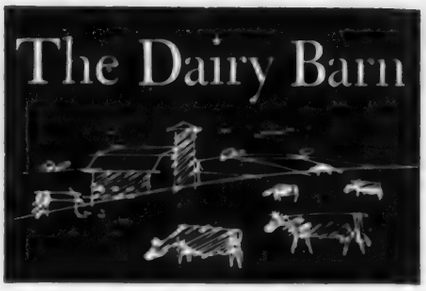
A GOOD TIME TO PLAN FOR YOUR '59 GRAIN

Make your winter evenings into a course of study for your spring plan of harvest. Think ahead! Look ahead! *What method of grain conditioning is best for you?* We invite you to consider DRY-O-MATION. It is available as standard equipment with many of the leading manufacturers of storage bins. *To help you evaluate DRY-O-MATION in relation to your own needs* we have some interesting literature for you to study over the winter. It's worthwhile reading and it's yours without obligation. *Just write us for it.*

For LOW COST . . . NO HANDLING . . . GRAIN CONDITIONING . . . consider

AUTO HUMIDITY CONTROL
DRY-O-MATION
NATURAL DRYING
IN THE GRAIN BIN

FARM FANS / DIVISION OF EWING FOUNDRY, INC. 424 S. Pennsylvania St., Indianapolis 25, Ind.



Pelleting Problems

Dairy farmers have found cows may give milk with abnormally low fat content if all the forage in their ration is ground too finely. The manufacture of hay or silage pellets often requires this fine chopping of the roughage, and thus the deficiencies of finely chopped forage have been attributed to pelleting. Pelleting is incidental, and a drop in the milk fat can occur whenever cattle receive only finely ground forage.

The fine roughage alters the chemistry of the rumen and reduces the production of acetic acid, from which butterfat is largely derived. Instead of acetic acid—the acid in vinegar—more complex acids like proprionic and butyric are formed.

Finely ground roughages move through the rumen too fast to be properly digested. The bacteria do not have enough time to act on the cellulose of the hay or silage and produce acetic acid. The starch and sugars in the forage, however, are more easily digested, and proprionic and butyric acids are formed from these.

There are two general results. First, as there is little acetic acid present, the butterfat content of the milk is depressed. Second, the total digestibility of the roughage is lowered, as the cow cannot use cellulose after it has left the rumen. Hence, useful nutrients pass out in the feces.

Experiments have shown the butterfat depression can be controlled by feeding sodium acetate along with the finely chopped forage. "As far as is known," said Dr. W. J. Tyznik, of Ohio State University, "there are no disadvantages from the use of sodium acetate. A cow with a low fat test is brought up to normal with one pound a day. But we have fed as much as two pounds a day, without bringing the fat test above normal. We used the sodium salt, not the acetic acid. The acid might alter the pH in the rumen, and also is unpalatable.

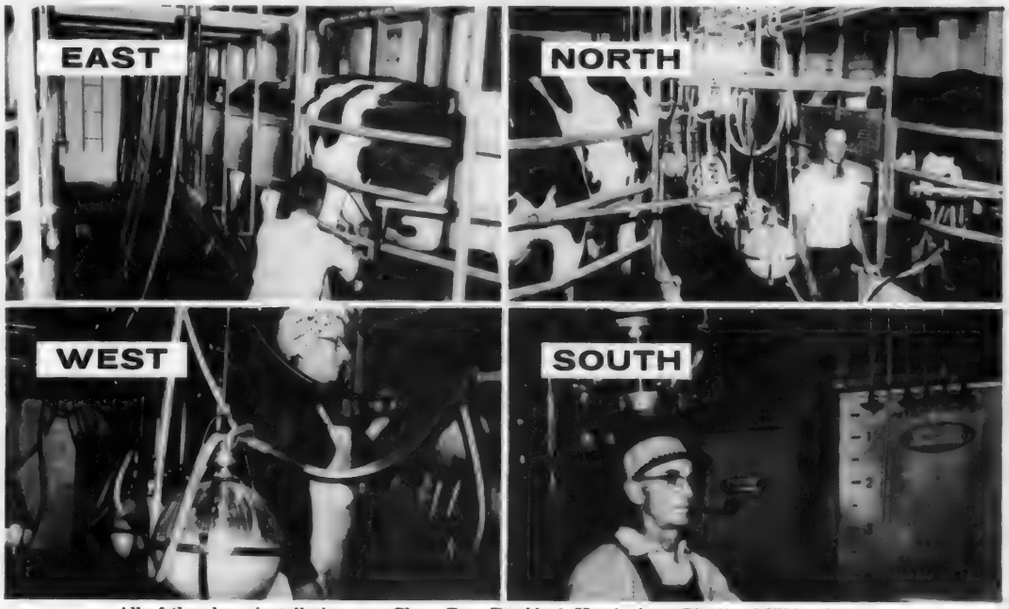
"'Hay or silage chopped one inch or longer will cause no drop in butterfat content," said Dr. Tyznik. "Finer forage may be fed if the animal gets at least six pounds of long hay a day. But," he cautioned, "when finely chopped forage is fed alone, the butterfat depression is just an indication of the trouble; the loss of digestibility is probably the more serious result. The animal is wasting a lot of its feed. A cow may commonly drop from four per cent butterfat to two per cent, but equally as great a loss occurs in the loss of nutrients. Adding sodium acetate may bring up the milk test, but it has no effect on digestibility.

(*Continued on page* 131)

Give Yourself A Handsome RAISE IN PAY

With A New

CHORE-BOY HERRINGBONE PIPELINE MILKING SYSTEM



All of the above installations are Chore-Boy, Double-6, Herringbone Pipeline Milking Systems.

EAST — D. D. Van Mater, Jr., Crescent Farm, Inc., Columbus, N. J., writes — "This is the most valuable equipment we have ever used on our farm. Chore-Boy makes it possible for one man to milk our 87 cow herd in 2 hours. It formerly required 3 men 4 hours to milk our cows."

WEST — Mr. and Mrs. Norman Hansen, Sedro Woolley, Washington, write, "Milking is now a pleasure with our Chore-Boy Herringbone System. A dairyman can increase his herd without hiring extra help. Our herd will be increased from 50 to 65 cows."

NORTH — Mr. Richard Kohler of Orrville, Ohio, writes — "We are very pleased with our Chore-Boy System. It is the fastest and easiest method of milking cows we have ever seen. The low vacuum does a good fast job of milking and has greatly reduced our mastitis trouble."

SOUTH — Ray Judy and Son, Millen, Georgia, write, "This is the most profitable equipment I have ever used and it does an excellent job of milking. I have been dairying for 22 years. In my opinion nothing can compare with it for saving labor."

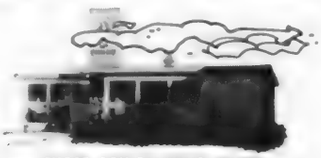
77 Cents – Or $4.00 Per Hour

In 1957, milk producers in Indiana received an average labor income of only 77 cents per hour, according to a Purdue University study.

In contrast to this low hourly income it is possible for an efficient operator, milking the maximum number of cows per man and using a Chore-Boy Herringbone Milking System, to net a labor return of $4.00 per hour. This hourly income is based on a herd averaging 10,000 lbs. of milk per cow and with milk priced at $4.00 per hundred pounds. In milking cows producing 12,000 lbs. per year, under the same conditions, the hourly income could be increased to $5.00 per hour. These are net returns as the cost of the investment is taken into consideration. This illustrates the great increase in earnings which are possible with a well-planned, efficiently operated Chore-Boy Herringbone Milking System. The many hundreds of Chore-Boy Herringbone users throughout the United States and Canada are proving every day that more cows can be milked per man — that the cows are milked better — and that milk of higher quality is produced. A Chore-Boy Herringbone System makes dairying a pleasant, profitable operation. For complete information on how a Chore-Boy Pipeline Milking System can be fitted into your operation call on your Chore-Boy Sales and Service Branch. See the list at the right.

CONTACT YOUR CHORE-BOY "KNOW-HOW" MAN

Your Chore-Boy dealer is more than a dealer and service man. He is trained to counsel with you on the milking and housing of your cows, whether you prefer loose housing or a stanchion barn system. His advice can help you produce higher quality milk at lowest cost. See your Chore-Boy dealer today—you'll be glad you did.



CHORE-BOY TRAINING CENTER
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MILKING SYSTEMS

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CAMBRIDGE CITY, INDIANA

OPPORTUNITIES FOR CHORE-BOY "KNOW-HOW" MEN

Chore-Boy's business is increasing so rapidly that many more "Know-How" men are needed. Applicants who are accepted receive an intensive course at the Chore-Boy Training Center. If you are interested and feel you can qualify write for an application blank. We will help those who qualify get into business or find employment with a franchised Chore-Boy dealer or distributor.

CHORE-BOY SALES and SERVICE BRANCHES

Each of these branches is responsible for Chore-Boy dealer appointments and for sales and service supervision in their respective areas.

NEW ENGLAND STATES
Willard F. Howland — Southampton, Mass.

NEW YORK AND NEW JERSEY
East N. Y. & North N. J. — Pimm Bros., Rock Tavern, N. Y.
South N. J. — Burlington Coop. Farmers Assn., Mt. Holly, N. J.
Central N. Y. — Nold Farm Supply, Rome, N. Y.
Western N. Y. — Dairy Equipment Co. of N. Y., North Java, N. Y.

PENNSYLVANIA, DELAWARE, MARYLAND, VIRGINIA AND WEST VIRGINIA
East Pa. — Ben Seamans Co., Factoryville, Pa.
Central Pa. — John Mackey, Chambersburg, Pa.
West Pa. — Dairy Specialty Co., 2119 Lindsay Rd., Pittsburgh, Pa.
S. E. Pa., Del. & E. Md. — Allen Miller, Jr. Chesapeake City, Md.
West Md., East & Central Va. — Richmond Dairy Equip. Co., 110 Jefferson St., Richmond, Va.
S. W. Va. & West Va. — H. V. Traywick Co., Lynchburg, Va.

NORTH CAROLINA
Chore-Boy North Carolina Co., C. H. Morrow, Statesville, N. C.

SOUTH CAROLINA
Columbia Refrigeration Service, 3515 River Drive, Columbia, S. C.

FLORIDA
Wilkinson Equipment Co., Jacksonville, Fla.

GEORGIA AND ALABAMA
Supply and Equipment Co., 500 Stewart Ave. S. W., Atlanta 10, Ga.

TENNESSEE, MISSISSIPPI AND LOUISIANA
East Tenn. — Skelton Dairy Equipment Co., 4134 Broadway, N. E., Knoxville, Tenn.
Central Tenn. — J. R. Cox Co., Inc., 325 Broad St., Nashville, Tenn.
West Tenn. & N. Miss. — Lewis Dairy Supply, 2261 Lamar St., Memphis, Tenn.
South Miss. — Roberts Farm Supply, Brookhaven, Miss.
La. — L. Murray Cain, 4783 Verne Rd., Memphis, Tenn.

KENTUCKY AND MISSOURI
West & Central Ky. — Stockyard Farm & Dairy Supply, 118-126 So. Johnson St., Louisville, Ky.
Southwest Ky. & Southeast Mo. — Allen McDowell, Jackson, Mo.
West, Central & South Mo. — M&H Industrial Supplies, Inc., 3951 Gravois Ave., St. Louis, Mo.

ARKANSAS
Cherry Chemical & Dairy Supply, Cabot, Ark.

MICHIGAN
Chore-Boy Milker Sales, 310 S. Hosmer St., Lansing, Mich.

OHIO
Northwest — Breniser Dairy Supply, Archbold, Ohio
East Central — Bryan Hardware Co., South Zanesville, Ohio
Central — Dairy Equipment Co. of Ohio, Pataskala, Ohio
Southeast — Stoot Farm Supply, Athens, Ohio
West — Farmer Feeder Co., Inc., Cambridge City, Ind.

INDIANA
Farmer Feeder Co., Inc., Cambridge City, Ind.

ILLINOIS
North — Crandall Dairy Supplies, 1010 W. Galena, Freeport, Ill.
Central — Harold Overbey, 3306 Butler St., Springfield, Ill.
South — G. W. Kleiboeker, Hoffman, Ill.

WISCONSIN
South Wis. — Crandall Dairy Supplies, 1010 W. Galena, Freeport, Ill.
Central Wis. — Milk Producers Supply, Beaver Dam, Wis.
Northwest Wis. — Rosford Refrigeration Service, Menomonie, Wis.

MINNESOTA AND NORTH DAKOTA
South Minn. — Farm & Home Supply, 118 N. Broadway, Rochester, Minn.
North Minn. & N. D. — Alstad Bros., Fergus Falls, Minn.

IOWA AND NEBRASKA
East Iowa — Farmer Feeder Co., Inc., Cambridge City, Ind.
West Iowa & Nebr. — Dairy Equipment Service, Millard, Nebr.

SOUTH DAKOTA
Swier Hardware Co., Colton, South Dakota

KANSAS, OKLAHOMA, TEXAS, EASTERN NEW MEXICO
Chore-Boy Southwest Co., 114 Patti, Wichita, Kan.

COLORADO AND WYOMING
Central Livestock Products Co., Inc., Derby, Col.

MONTANA, IDAHO AND UTAH
Cecil Nordby, Gooding, Idaho

ARIZONA
Arizona Milk Producers Assn., Phoenix, Ariz.

CALIFORNIA, NEVADA AND OREGON
Chore-Boy Western, Inc., 24 Ehrmanway, Medford, Ore.

WASHINGTON
Washington Farmers Coop. Assn., 201 Elliott Ave., W., Seattle, Wash.

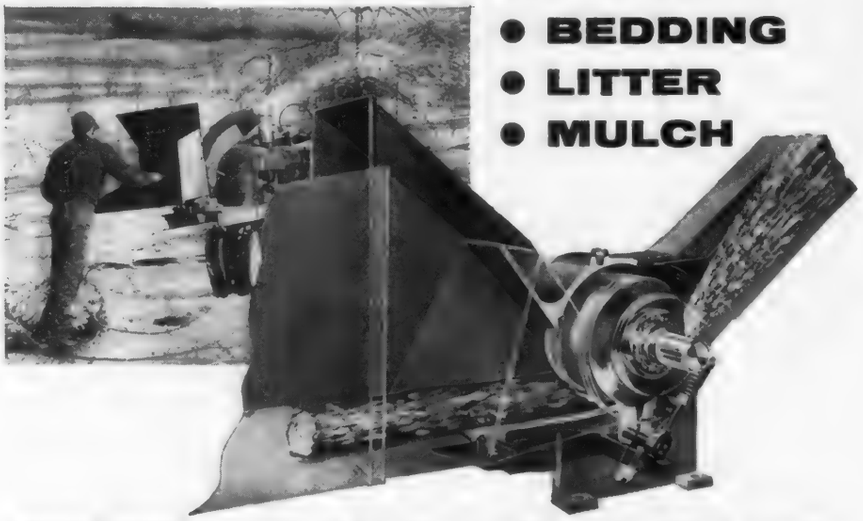
CANADA
QUEBEC AND MARITIME PROVINCES
Richelieu Equipment Redg., 228 St. Hubert, St. Jean, Quebec

ONTARIO
Ridler Mills, Ltd., Newmarket, Ont.
N. W. Ontario — Boles Feed Ltd., Ft. William, Ont.

SASKATCHEWAN, ALBERTA AND BRITISH COLUMBIA
Dairy Supplies Ltd., 10221 108th St., Edmonton, Winnipeg, Saskatoon, Vancouver

EXPORT
Midwest Agricultural Export Co., Box 985, Madison, Wis.

USE A FITCHBURG *Farm* CHIPPER TO MAKE LOW-COST



- BEDDING
- LITTER
- MULCH

Brush removal is always a tough farm chore . . . hard to load . . . difficult to handle. But you take the hard work out of hauling brush with a Fitchburg Farm Chipper. Brush can be quickly reduced to easy-to-haul wood chips. Chips used to make manure, or as mulch can make brush removal profitable on your farm, too. A FITCHBURG FARM CHIPPER WILL WORK FOR YOUR FARM . . .

. . . IN POUND YARDS:

Wood chip bedding stands up better in wet spots. Pound yards bedded with wood chips cake less for faster loading, easier spreading, yet the chips hold up longer near gates and water troughs. Absorbent wood chips will carry plant nutrients to crop land . . . supply crops with a humus that lasts. Seed beds crust less for better germination . . . tight ground holds moisture better . . . stays open longer.

. . . IN ORCHARDS:

Pruning disposal in orchards combines into one simple, soil building operation when a Fitchburg Farm Chipper is used. Tree trimmings need no longer be hauled. Brush can be fed into the chipper and the chips blown around the trees for mulch. This moisture-holding mulch can be worked into the ground with cover crops or left for weed control.

. . . DAIRY BARNS AND POULTRY HOUSES:

Tough absorbent wood chips really stand up in dairy barns and poultry houses. Your Fitchburg Farm Chipper will cut poultry production costs, reduce dairy barn straw requirements by producing litter and bedding from your wood lot. At clean-up time, or whenever clean bedding is needed, your Fitchburg Farm Chipper will chip bedding or litter quickly at low labor cost. Wood chips can be the answer to your difficult bedding and litter problems—A Fitchburg Wood Chipper will supply wood chips quickly and easily.

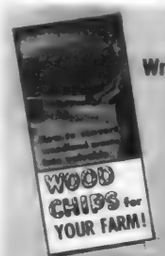
YOUR BEST FARM BUY IS

A FITCHBURG FARM CHIPPER:

The Fitchburg Farm Chipper is engineered for rugged, all-day service. Normal lubrication, with periodic sharpening of the tough chrome steel blades, keeps the Chipper on the go. Thanks to the Safety Spring-Activated Feed Plate, standard equipment on all Fitchburg Chippers, the Chipper adjusts itself instantly to different size wood to give safe, smooth chipping that keeps a Farm Chipper way ahead of clean-up crews. The economy and speed of operation will soon return the Fitchburg Chipper's price of $650 for the mulch Chipper; $960 for the bedding Chipper.

. . . WITH A ONE YEAR GUARANTEE:

The one year guarantee given with every Fitchburg Farm Chipper assures you peace of mind and guaranteed economy of operation. Find out how a Fitchburg Farm Chipper will save time, labor, and money on your farm.



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This free booklet gives complete details...see how other farmers use the Farm Chipper . . . compare the facts with your farm.

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Send my free copy of "Wood Chips for Your Farm!" to:

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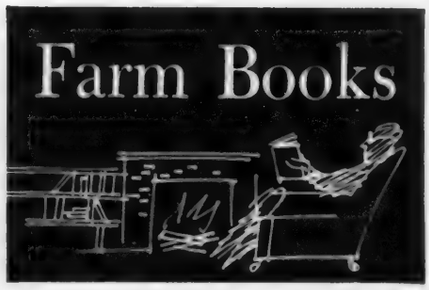

American Agriculture, *by Edward Higbee. John Wiley & Sons, Inc., New York. $7.95.*

Four hundred pages—or four thousand—are not enough to describe American agriculture, in anything but general terms. This is more a geography than a book on farming, yet it gives a clear picture of the areas of land use in the U.S., particularly based on the water availability.

Land use, and even more important, water use, is described by Dr. Higbee, as it covers ranching and cotton, or tobacco and cranberries. Soil conservation under many of the different types of farming, dairy, corn, ranch, grows from its history to its present importance. An appendix, showing the distribution of the major crops and economic areas, may break down a few deep-seated prejudices—for instance, are you *sure* you know where soybeans are raised, or where we have concentrated more than five million acres of flax?

Tree Care, *by John M. Haller. The Macmillan Company, New York. $5.95.*

An extremely detailed and comprehensive book on many phases of tree culture. A layman might be surprised at the extent of the subject. Tree surgery, repair, bracing and disease control are but a few of the divisions. A book to consult rather than to read.

Pheasants in North America, *edited by Durward Allen. Stackpole Co., Harrisburg, Pa. $7.50.*

In its 490 pages this volume tells the story of the Oriental pheasant since it was first successfully introduced into this country and released in Oregon in 1881. Since that time the big and colorful pheasant has become a common sight on farm lands in many of the country's most fertile parts. The bird has become one of the most popular game birds and has successfully occupied territory left vacant by the disappearing prairie chicken and other natives left homeless by man's advance.

In this book Dr. Allen, associate professor of wildlife management at Purdue and nationally recognized expert on wildlife management, brings together the findings of the country's leading pheasant specialists. Experts from all sections where the pheasant prospers cover in detail the life history, management and habits of the bird. For the reader who craves full particulars on the life of the ringneck pheasant in America, this is the book.

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The hay crop which makes up your winter's feed is too valuable to gamble on with experiments. What you need at hay time is experience and Cunningham has more conditioning experience than all the other makes combined. Cunningham was first to pioneer the development of "crimping action" conditioning and today Cunningham is first choice, coast to coast, among farmers who recognize the increased value of full protein hay. Be sure you're getting the best... it costs no more to own the world's finest conditioner. Count on Cunningham... the oldest hand at hay conditioning... year after year, crop after crop... this experience pays off for you... no wrapping... no plugging... no breakdown.

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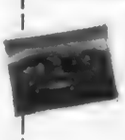

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When Massey-Harris know-how on *combines* teamed up with Ferguson *tractor* know-how under the new Massey-Ferguson trademark a year ago, good things for you had to happen . . . and did.

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Look, compare . . . you'll be a Massey-Ferguson man!

Spread out before you is just a part of the new *big* line of Massey-Ferguson equipment that will help you make 1959 your most profitable farming year.

This bright panorama reveals something important to every American farmer. It tells you that the advanced engineering that has made Massey-Harris combines and Ferguson System tractors world-famous is now available to you in equipment for practically *every* type of mechanized-farming operation. And . . . there's even more to come in 1959!

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DEKALB SURE BOOSTED MY
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REALLY HOLD THEIR EARS

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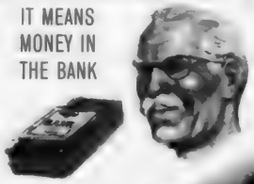
ANOTHER THING—
DEKALB GETS RIPE AND
SURE PICKS EASY

What Does DEKALB Mean to Me?

IT MEANS
MONEY IN
THE BANK



DEKALB

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"ONCE I have surveyed my customer's irrigation needs, the first thing I settle is the pump. It's the heart of the system. It must be right as to size and performance or my customer's investment won't pay off at full value.

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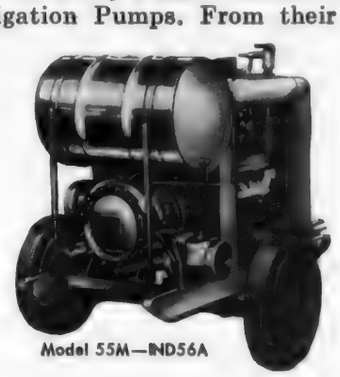
"And, with Gorman-Rupp Pumps, I can design an *engineered system* that's geared to the crops, soil and land contours . . . a system planned for profit, not built piecemeal."

Make sure your irrigation system is engineered to *your* needs. See your nearest Gorman-Rupp Irrigation Pump Dealer or fill out the attached coupon. No obligation.



Model 55M—IND56A

Pictured is Mr. Kenneth Dennehy of General Irrigation Co., Warehouse Point, Conn., who sells Gorman-Rupp Irrigation Pumps.

THE GORMAN-RUPP COMPANY
305 Bowman Street, Mansfield, Ohio

Gentlemen: I want an Engineered Irrigation Plan developed for my farm. Have your Irrigation Pump Dealer contact me at no obligation to me.

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Here's the key to low-cost irrigation

USS National Polyethylene Pipe—NSF Grade

This rugged plastic pipe is the answer to your irrigation problems. Low-cost USS National Polyethylene Pipe is so lightweight it can be carried in a roll like hose . . . so flexible it can be run around corners, over obstacles and under fences . . . it resists corrosion, acids, alkalies and salts. And National Polyethylene Pipe retains its flexibility and toughness over its entire working range from minus 90°F. to plus 120°F.

Vital statistics—National Polyethylene Pipe is made of 100% virgin polyethylene plastic to which 3% carbon black filler has been added to prevent deterioration from ultraviolet rays. It is available in lengths up to 400 feet, and sizes from ½-inch to 6 inches in diameter. The inner surface of the pipe is smooth . . . offers little flow resistance.

Installation—National Polyethylene Pipe is amazingly easy to work with—installation is a one-man job. Just carry a coil on your shoulder to where you want it and unroll it. Cut it with a hacksaw or a knife, insert the fittings and secure them with a clamp.

Get complete details on the many uses of National Polyethylene Pipe by writing to: National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa. Ask for Bulletin No. 29.

USS and National are trademarks

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

National Tube
Division of
United States Steel

"The world's largest and most experienced manufacturer of tubular products—National Tube"

Much ado (too much) about a gooseberry We don't know of a fruit that enjoys less popularity in America than the gooseberry. But in the Cheshire district of England it is regarded as a berry par excellence. It is grown extensively there and the very odd British make pies and preserves from it which they eat with a good deal of enjoyment. One of our readers in Cheshire recently reported that they have just closed a contest for the biggest gooseberry of the season. With customary British restraint, our correspondent fails to inform us of the size of the prize-winning fruit. Most of her letter was devoted to ways and means of keeping the berries from exploding. It seems that about the time a gooseberry reaches prize-winning proportions it explodes. To guard against this tragedy, gooseberry fanciers shade them with umbrellas, tents, and some tie them up in paper bags. Entries in the contest are kept overnight. If one explodes during this period it is automatically disqualified.

The gooseberry, teamed up with the currant, was a standard hedge border for old-fashioned kitchen gardens. Our grandmothers made delightful currant jelly, and gooseberry pies in season. To tell the truth, gooseberry pie was never very good, anyway, and it's a good thing that it has fallen out of favor. It was full of seeds, and tart, and its flavor was bleak and medicinal.

Mighty Midgets Most scientists are devotees of the American cult of bigness. Result: —big corn, big skyscrapers, big pigs. However, there is a very active and dedicated minority who refuse to believe that bigness, in itself, is a good thing. These men are quietly working on the theory that smallness, too, has its virtues. Recently announced is a breed of hen which weighs one-third less than the average layer, consumes one third less feed, and yet lays a standard egg.

Now, the Hanford atomic center laboratories have announced a miniature pig which will be used for research purposes. This pig, a distant cousin of the European wild boar, will weigh only 150 to 200 pounds when fully grown, compared to the 400 to 700 pounds mature weight of the average hog. It is hoped also that the new breed will have white skin to make them useful to the radiation engineer.

Would You Believe This Tractor Has More Power Now Than 17 Years Ago?

Robert Bielfeldt *knew* it had, but how *much more* he didn't know until he was

..."*Shown by actual Dynamometer test*"

Like most young farmers, Bob Bielfeldt *has* to get a lot of mileage out of his equipment on his 160 acres of mighty good dirt just south of Anchor, Illinois. He's using a 1941 M Farmall originally bought by his father, Adolph, back in December of '41. There are a lot of 1941 M's still doing a good day's work around the country, but here is the rather amazing story of Bob Bielfeldt's '41 M in his own words:

"Dad's M was rated at 36 horsepower when he bought it new in 1941. Just before I took over the farm in September of 1950, he had a set of M&W Pistons installed and did they make a whale of a difference! But I didn't know just how many more horses they added until I took it in this spring to have an M&W Quick Action governor installed. While there, I had it put to a Dynamometer test and it registered just under 50 horsepower—14 more than when brand new! And, mind you, those M&W Pistons were installed 7½ years ago and the engine hadn't been touched since!"

Remarkable! But that isn't the end of the story. This fall, Bob's old "M" started using a little oil. When he had it torn down for re-ringing, he decided instead to install new M&W Turbo-Dome Pistons. The result: "My neighbors told me what these new pistons would do but I could hardly believe it! They not only shot the old M's horsepower well up over 50 without any reboring or increase in piston size, but I've been using even less fuel in heavy plowing this fall!"

Bob estimates he works his '41 M at least 600 hours a year and most of it at heavy loads—plowing, discing and feed grinding. Fuel consumption in heavy plowing runs only 3¼ to 3½ gallons per hour and he pulls 3-14" plows in 3rd gear. "Could do it in 4th," he says, "but it throws dirt too far." As it is, he turns under an acre every 30 to 35 minutes. That's hustling!

If you want 1960 new tractor performance and even greater fuel economy, turn to M&W's exclusive Turbo-Dome Pistons. They squeeze every ounce of power from every drop of fuel like no other pistons in new tractors or old. They *will* increase the horsepower and operating efficiency of *your* tractor—*regardless of age, make or model*. If in doubt, write today for the name of your nearest M&W Turbo-Dome Piston dealer. You *can* have 1960 tractor performance from your old tractor TODAY!

Write for your copy of FREE booklet - LASTING POWER

M&W TRACTOR PRODUCTS

3912 Green Street • Anchor, Illinois

M&W TRACTOR PRODUCTS

PROVED

ON THE FARMS OF AMERICA

PROVEN BY FARMERS IN EVERY ONE OF THE 49 STATES

THE BEST
FLEXIBLE PLASTIC PIPE FOR LOW COST FARM USE

MUELLER BRASS CO.

Streamline

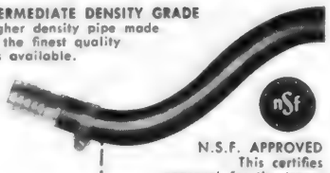
(INTERMEDIATE DENSITY GRADE*)

PLASTIC PIPE AND FITTINGS

Your farm water supply system installed with Streamline Polyethylene Plastic Pipe will have longer life and give more dependable service, even under extreme conditions such as repeated freezing. It has far greater burst strength and higher resistance to creep and stress crack than conventional plastic pipe. Also resists the action of rust, rot, corrosion, bacterial growth, acids and alkalies. Flexible, for easy installation above or below ground by one man . . . lines are readily re-located . . . can be connected to existing systems. For an economical, trouble-free water system be sure to use Streamline Plastic Pipe.

The ideal pipe for deep wells, domestic cold water service, irrigation and land drainage, cleaning and watering stock.

*INTERMEDIATE DENSITY GRADE
A higher density pipe made from the finest quality resins available.



N.S.F. APPROVED
This certifies approval for the transmission of drinking water.

Produced to Commercial Standard CS 197-57

Write today for your copy of this informative book that gives you the complete story of Streamline plastic pipe and fittings.

MUELLER BRASS CO.
PORT HURON 48, MICHIGAN

C-100

ORAL M. ROBISON
ELEVATOR
Lathrop, Mo.

SCALE TICKET

Date 7-28-58

Gross . . . 7780 lbs.
Tare . . . . 7180 lbs.
Net . . . . 600 lbs.

— Description —
Charolais Steer Calf
Born 1/27/58
Weighed off pasture
6 months

McGINNESS CHAROLAIS
Gains 100 Pounds per month . . .

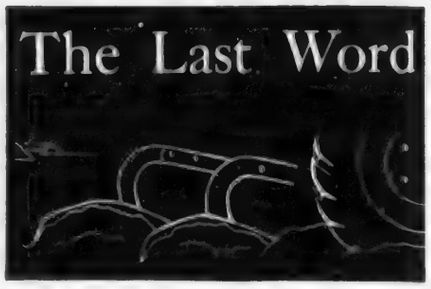
THE SOURCE BREED

By upgrading your herd with McGinness Charolais or Charbray breeding stock you can get at least 20% more beef on 10% less feed. The scale ticket shown above is representative of Charolais gains—usually 100 pounds per month during their first year. Investigate McGinness' 7-point selling policy—including a trade-in feature up to 2 years after date of purchase. Choose from the Mid-West's largest assembly of Charolais and Charbray herds.

Send for this informative brochure—profusely illustrated with unretouched photos of individual animals and herd shots.

McGINNESS BROS. RANCH
Box 723, Excelsior Springs, Mo. or Rt. 7, Lathrop, Mo.

The Last Word



Parched Corn The Corn Industries Research Foundation calls our attention to the problem of drying corn at excessive temperatures. Drying at higher than 140 degrees Fahrenheit, they say, tends to convert corn starch to paste, damages the corn oil, and makes a separation of starches and proteins difficult. Heat doesn't damage the feeding value, but if corn is being sold as a commercial crop, drying temperature should be kept below 140.

Wool Fights Back The wonder fibers produced from a test tube have been cutting deeply into the wool market. Now, wool is becoming a wonder fiber itself. The new woolen garments will be crease-proof, stainproof and mothproof. And before long they may well be shrinkproof, too. From Australia comes a method of spraying ammonium thioglycolage onto the garment, then pressing in pleats or creases which stay there permanently. The chemical is also used in permanent wave liquids where it does the same job on human hair.

Fabrics treated with the stainproofing material can be cleaned of spots with the wipe of a damp cloth. Mothproofing with minute amounts of a new chemical make the fiber poisonous to the destructive moth grub. Even the name of the chemical is formidable. It is Hexachloroepoxyoctahydroenoexidimethanonaphthalene.

With these and the anti-shrink treatment to come, wool's competitive position has been immeasurably improved.

Grub-free County In Story County, Iowa, a voluntary, self-financed drive to rid the area of cattle grubs is being tried this winter under the direction of entomologist Earle Raun of Iowa State College. Using the two new systemic insecticides, Co-Ral and Trolene which kill grubs inside the animal, Raun hopes for a successful demonstration which, next year, may be extended to the entire state. For details on systemics see THE FARM QUARTERLY, Autumn, 1958, "Grub Rub-Out."

Nitrogen as Insecticide Working in much the same fashion as a systemic insecticide, nitrogen fertilizer has been found to repel or possibly poison insects which attack the plants which have been heavily fertilized. In Wisconsin, it was found that buckwheat thrived in spite of heavy aphid attacks when it had been fertilized while unfertilized plants succumbed. The same story is true of red pine seedlings under attack from the sawfly larvae.

Take this one easy step toward

HIGHER POULTRY PROFITS

To get top profits you must have healthy, disease resistant layers bred to produce ***more eggs*** and ***better eggs*** at a minimum cost. H&N "Nick Chick" Leghorns are just such birds.

H&N's entire breeding program—from genetic and physiological research to an extensive system of testing, measuring and recording—has one basic purpose: to produce layers that earn the ***highest possible profits.*** H&N calls this program ***Balanced Breeding.***

MORE FIRST PLACE INCOME AWARDS

Here's proof of the success of ***Balanced Breeding:*** H&N's have won more than twice as many Random Sample Test ***awards for highest income*** than any other breeder. In fact, H&N has won ***40% of all first place awards*** in the 43 tests entered to date . . . and in current tests H&N's are continuing to chalk up performance records in the same manner that has earned them, year after year, the right to the title of ***America's All-Time Profit Champions.***

30,000,000 HATCHED LAST YEAR

From the very start, when H&N were first introduced (from a hatch of only 56,000) the demand for H&N's has grown steadily to a hatch of over 30,000,000 a year. This is a sure sign H&N "Nick Chick" Leghorns are earning higher profits ***on the 20,000*** poultry farms where they are being used.

H&N "Nick Chick" Leghorns have won every 5-year Average Award offered by the California Random Sample Test. In the 1952-57 California Five Year Test H&N pullets earned 27c more per pullet per year than the second place bird, 79c more than the average of all competing strains. H&N was also first in egg quality, and first in least feed eaten per dozen eggs (4.4 lbs.). In the 1957 annual test H&N topped all 45 floor entries with a record of 279 eggs per pullet housed.

In the tests, on farm after farm, and year after year, H&N's have consistently measured up to their one major responsibility—higher poultry profits! But eggs laid by H&N's on other poultrymen's farms—or in Random Sample Tests—aren't earning profits for you.

Now is the time—this year—to take this one simple step toward increasing ***your*** poultry profits! ***Put H&N's to work for you on your farm.***

Get the facts about H&N "Nick Chick" Leghorns. Write for this FREE booklet today!

HEISDORF & NELSON FARMS, Inc.
P. O. BOX 428 • KIRKLAND, WASHINGTON

BRANCH HATCHERIES in
PETALUMA, TURLOCK and RIVERSIDE, CALIFORNIA

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Gentlemen: Please send me your new FREE 28-page booklet about H&N "Nick Chick" Leghorns.

NAME.....

ADDRESS.....

CITY.....STATE.....

"OUR EATON 2-SPEED AXLE

SAVES TIME IN THE FIELD, MAKES TIME ON THE ROAD"

—SAYS FRUIT GROWER J. F. WHITBECK, ORONDO, WASHINGTON

"When we harvest perishable fruit, a few minutes saved means a dollar earned," says Mr. Whitbeck, who grows pears, apples, peaches, plums and cherries in the Columbia River Basin. "To save time is why I specified an Eaton 2-Speed Axle on my GMC truck. The Eaton low-gear range furnishes the pulling power needed to drive into orchards made soft by irrigation, and bring out capacity loads without delays.

"In addition to tough off-the-road orchard hauling, the Eaton 2-Speed gives us fast highway trips to markets in Seattle, Tacoma and Spokane. Because of the versatility of our Eaton 2-Speed, we can travel over level highways, steep foothills and long mountain grades without harmful, excessive engine strain—and still save as much as an hour and a half on a 200-mile trip.

"After 15 years of operating Eaton-equipped trucks, I know that an Eaton 2-Speed conserves fuel and lowers maintenance costs. What's more, it gives the driver full control of the truck, safeguards the cargo too. With steady power for slow, smooth starts, the load doesn't shift and crush itself. And, on steep downgrades, the low-gear range helps prevent burned-out brake linings."

Like Mr. Whitbeck, you can get added safety, economy and handling ease when you specify an Eaton 2-Speed Axle. Ask your dealer for a demonstration.

"WE HAUL ABOUT 1500 BOXES of fruit a day during harvest season," says Mr. Whitbeck. "On the road to market, Eaton's high-gear range assures top legal speeds at low engine RPM—that reduces trip time, cuts engine wear and fuel consumption."

GMC TRUCK SALES MANAGER, Ray Mansfield, Jones Pontiac Company, Wenatchee, Washington, says: "Customers with Eaton-equipped trucks tell me they get top prices at the morning fruit market. That's because they get there first—before the other growers who operate trucks with conventional axles."

EATON

2-SPEED TRUCK AXLES

MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

shift to

BIG STICK farming

Power with 3-way Punch!

POWER with a new three-way punch . . . 42 percent more *pull* in low range . . . almost 50 percent more *speed* in high range . . . and *live power take-off* that matches forward speed to crop conditions. That's the exclusive Power Director (The Big Stick) in action!

But that isn't all. In Allis-Chalmers Dynamic D-14 and D-17 Tractors, this extra power and speed are used to full work capacity through the TRACTION BOOSTER system which gives ground traction automatically as needed.

With this modern combination of pull power, speed *and* traction, you farm deeper . . . wider . . . faster . . . with less fuel used per acre.

All this . . . and more . . . is yours to command from the easy-riding seat of a 3 plow D-14, or a 4 or 5 plow D-17 . . . when you shift to *Big-Stick* power.

Your Allis-Chalmers dealer invites you to try this new kind of farm power in a free demonstration on your own farm . . . any day you say. Make it soon.

Listen! *National Farm & Home Hour*
Every Saturday—NBC

ALLIS-CHALMERS, FARM EQUIPMENT DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

TRACTION BOOSTER is an Allis-Chalmers trademark.

Best of breed for fair and farm

...Butler metal buildings

A champion in its own class is the Butler metal building that houses the livestock exhibition at the Taylor County Fair in Abilene.

The sturdy Butler structural system keeps supporting columns to a minimum. Steel roof beams completely span each arena, providing spacious, unobstructed areas for cattle and viewers. Visibility is superb. Natural daylight floods the interior through translucent panels in the roof.

The air keeps fresh naturally. The gable design channels odors and hot, stale air up and out continuous peak ventilators. And the die-formed metal cover paneling is as rain-tight and as wind-safe as a one-piece metal shell.

But you don't have to go to a fair to see modern Butler buildings. They are already on hundreds of farms and ranches, protecting livestock, grain, machinery and tools in a way that cannot be duplicated by traditional farm buildings.

Butler farm buildings are not the lowest in cost—measured in mere dollars. But measured in years of service per dollar—in fire safety, unobstructed interiors, and utility that remains the same no matter how your farm practices may change—Butler is your lowest-cost farm building.

The mezzanine dormitory for exhibitors is neatly tucked under the weathersealed Butler metal roof—creates a modern, functional appearance that is strikingly distinctive.

GET THE FULL STORY
FROM YOUR BUTLER BUILDER—
OR WRITE US DIRECT

BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY

7378 East 13th Street, Kansas City 26, Missouri

Manufacturers of Metal Buildings • Equipment for Farming, Dry Cleaning, Oil Production and Transportation, Outdoor Advertising • Custom Fabrication

Sales offices in Los Angeles and Richmond, Calif. • Houston, Tex. • Birmingham, Ala. • Atlanta, Ga. • Kansas City, Mo. • Minneapolis, Minn. • Chicago, Ill. • Detroit, Mich. Cleveland, Ohio • Pittsburgh, Pa. • New York City and Syracuse, N.Y. • Boston, Mass. • Washington, D.C. • Burlington, Ontario, Canada

You'll find dozens of uses in every season for your Crop-Chopper!

New all-purpose Crop Chopper with Curvo-Thrust!

DOES ALL THESE JOBS
—and does them fast!

- Cuts green feed
- Chops silage—grass, oats, peanut vines
- Shreds and spreads cornstalks, cotton stalks
- Clears stubble, brush
- Mows weeds
- Tops beets, potatoes, sagebrush
- Makes bedding of cornstalks or straw
- Shreds orchard and vineyard prunings
- Clips pastures
- Clips waterways
- Mulches orchards
- Harvests mint
- Chops flax
- Cleans up rice stubble

Here's the most advanced, the most versatile economy chopper ever offered—the New Holland 33 Crop-Chopper!

Thirty-two free-swinging knives cut standing crop or windrows. They deliver it to a 12″ auger which in turn carries it to the exclusive Curvo-Thrust fan. It *recuts* the material into fine pieces. The exclusive cup-shaped paddles on the Curvo-Thrust fan blow the chopped crop out the discharge spout and quickly fill every corner of the trailing wagon. And the silage is *clean*, for no dirt has been sucked in!

Behind you, a clean, uniformly cut field and fine-chopped crop. Before you, years of simple, economical operation with the "33." See it soon! New Holland Machine Company Division of Sperry Rand Corp., New Holland, Pennsylvania.

NEW CURVO-THRUST FAN is equipped with exclusive cupped paddles that assure more positive throwing action and even distribution of material throughout the wagon as it comes out the spout. Its recutting knives assure fine, double-cut material.

NH NEW HOLLAND
"First in Grassland Farming"

Rush me the details!

Please send me free catalog on the Model "33" Crop-Chopper.

New Holland Machine Company
912 Oak Street, New Holland, Pa.

Name:_____

Address:_____

Profit-engineered...from boar to bacon

LIFE CYCLE FEEDING

Here's how it can help you cut swine production costs

Could you make a profit on a $15 hog market? Top producers can. Read here how your feed manufacturer's 1959 Life Cycle Swine Feeding Program can help you get the lowest-cost, highest-profit production you ever had.

Life Cycle Feeding is based on three simple, but important principles:

1. Feed For Big Profits Per Litter and with Life Cycle Feeding the profit per pig will take care of itself.

2. Pigs Are Made, Then Born. Life Cycle Feeding was developed to help you get—and keep—a greater number of vigorous, healthy pigs per litter. Extensive research over the years has shown that the nutrition and health of a pig really begins in the sow's gestation and lactation rations. Complete, balanced nutrition—geared to the growth needs of the sow and her unborn litter—helps eliminate dead or weak pigs . . . gives your litter a head start to top-profit production.

3. Swine Are What They Eat. Tests show that swine not only do better when they are fed better . . . but that the rations fed during one stage of the life cycle will influence the growth, health and feed efficiency of the next.

How Life Cycle Feeding Becomes Important. Today, there are 2½ million farms in the swine production business. Yet, a recent university estimate shows that 60,000 producers, averaging 100 sows with two litters of 8 pigs per year could match the entire pork output of those 2½ million. How? Just by applying the *known*, *proven* feeding and management practices of efficient swine production.

The incentive to become a top producer is great—the pay is good. Under today's market conditions you could make 5 to 6 times the profit per litter of the average producer. How?

The average farmer saves 7 pigs per litter, puts on 100 lbs. of gain at a cost of $14.25, makes $1.50 profit on a 200-lb. hog sold at $15 per cwt., for a total litter profit of $10.50.

Top producers can wean as many as 10 pigs per litter, get 100 lbs. gain for $12, make $6 profit per hog on a $15 market, for a litter profit of $60.

How can you become such a top producer? As every swine raiser knows, the first steps are keyed to good breeding and management. But, it takes good feeding to bring out the best of breeding and help you get the most out of your good management practices.

In formulating his Life Cycle Feeding Programs for 1959, your feed manufacturer has helped you take a big step towards that top-profit goal.

By combining all the latest, proven swine nutritional findings in his formulas, he is putting to work the results of millions of dollars of university and feed industry research designed to bring science to your farm in a feed bag.

See your favorite feed supplier soon for complete details on his Life Cycle Feeding Program and his profit-making feeds containing Terramycin.

WHY LIFE CYCLE FEEDING IS NEEDED

Basic nutrient needs change with each stage of growth

	Pre-starter	Starter	Grower I 6-9 wks.	Grower II 9-13 wks.	Grower III 13-18 wks.	Finisher	Pre-gestation	Gestation	Lactation
Protein % of ration						12-13%			
Calcium % of ration									
Phosphorus % of ration						0.33%			
Vitamin A Palmitate in Gelatin I. U. lb. Ration					500	500			
Terramycin gm/ton of ration				10	10	10	10	10	10
Vitamin B_{12} mg/ton			20	10	10	10	10	10	20

WHAT IS LIFE CYCLE FEEDING?

Life Cycle Feeding is keyed to the principle that each stage of the life cycle of swine has different nutritional needs. Formula feeds, made according to these principles, supply the correct balance of nutrients needed for top performance in each stage of growth and development. In general, they fall into the seven main groups listed below:

GESTATION STAGE. Feeds must supply extra calcium, phosphate, important trace minerals and vitamins with an abundant supply of body-building protein for building big, husky pigs.

LACTATION STAGE. Feeds are higher in protein and other nutrients needed to stimulate heavy milk flow of proper composition.

PRE-WEANING STAGE. Prestarter type feeds are very palatable. They have high levels of antibiotic, sweetening agents and milk products to help get baby pigs on dry feeds fast.

WEANING STAGE. Starter feeds are high in protein, vitamins, antibiotic and other body-building ingredients to make pigs grow faster, keep sow in better condition, fight scours and secondary infections.

GROWING STAGE. Nutritional requirements change rapidly as swine start developing body framework and gaining faster. Balanced feeding supplemented with antibiotics helps you get highest profit gains.

FINISHING STAGE. Swine need less protein with a proper balance of protein, minerals, vitamins and antibiotic for top gains at low feed costs per pound of gain.

STRESS PERIODS. During critical periods such as lactation, weaning, severe weather changes and at times of high incidence of disease, swine need the protection of high-level antibiotic feeds.

How LIFE CYCLE FEEDS are made better with Terramycin

FASTER GAINS

	GROWTH INDEX, SWINE	
	Low Level Antibiotic under normal conditions	High Level Antibiotic under unusual conditions
Terramycin	117.6	190
Bacitracin	110.9	99.5
Penicillin	110.4	97
Streptomycin	109.0	128
No antibiotic	100.0	100.0

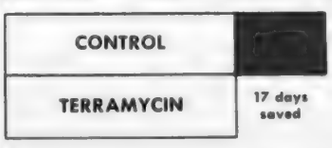
Based on typical responses in growing and fattening swine at leading Agricultural colleges, reported in "Practical Aspects of the Use of Antibiotics in Rations of Livestock", 1957

BETTER FEED EFFICIENCY

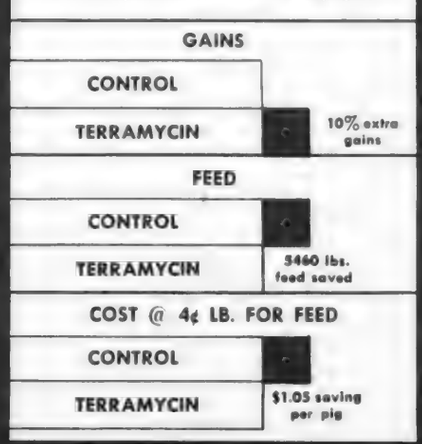
	Control (no antibiotic)	Terramycin in feed
Average daily gain, lbs.	1.35	1.63
Average daily feed cons., lbs.	4.90	5.46
Average feed per lb. gain, lbs.	3.62	3.35

(Typical response from 1958 trial)

LESS FEEDING TIME TO MARKET WEIGHT

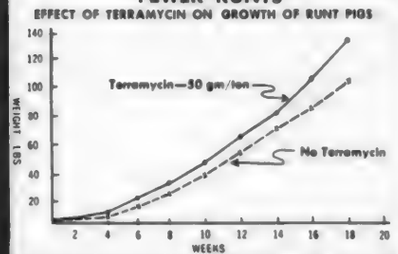


LOWER FEED COSTS
Value of feeding antibiotics
an experiment with 130 pigs



FEWER RUNTS

EFFECT OF TERRAMYCIN ON GROWTH OF RUNT PIGS



BETTER HEALTH

When used at recommended levels, Terramycin in feeds can:

PREVENT OR TREAT

Scours or bacterial diarrhea
Enteritis
Secondary diseases
Atrophic Rhinitis (aid in the maintenance of weight gains and feed consumption in presence of this disease)
Leptospirosis (prevent abortions and birth of weak or dead pigs due to Leptospirosis)

Pfizer

LIFE CYCLE FEEDING with Terramycin®

INTEGRATED NORSE

How well have the highly organized cooperatives of Scandanavia solved the production and marketing problems of farmers? What can American farmers learn from the integrated Norse?

By R. J. McGinnis

FOR THE PAST fourteen years, I have visited a foreign country each year to live with a farmer and report what it's like to farm in Yugoslavia, Libya, Ireland, the Dominican Republic, and many other lands.

The world over, farmers are brothers. We share the same problems, we make identical mistakes. We suffer defeat from the same enemies: bugs, weather, and disease. And we are uplifted by the same riches: the fertile earth, an hospitable climate, a love for God, and our work.

To report on national cooperatives, I went to Norway.

Here in America we have done well with co-op farm stores, farmer-owned gasoline and insurance companies, and co-op marketing organizations in wheat and in speciality crops such as lemons and blueberries. But what is it like, I wanted to know, to live in a country where almost all the farming is handled through cooperatives: not just in buying farm supplies, but in *growing* the crop and in *selling* it, too?

Is the farmer richer—or poorer for the experience? May we benefit from observing him?

Like all great humanitarian movements, the Norwegian co-ops were started by sincere men, genuinely interested in bettering the lot of their fellows. In the beginning, the main idea of the producer co-ops' was to help the farmer get a better price on the market, to improve the quality of his crops, and to cut out the drain on his profits taken by the middleman. Today, his co-operatives control farming, lock, stock, and barrel. Some of the co-ops' profits in serving as middlemen for the farmer go into slaughter houses, creameries, a vast bureaucracy, and administrative costs. The farmer owns this rich set-up, although these riches do not appear as cash in his pocket. Is he ahead? On a per acre basis he is one of the most mechanized farmers in the world with roughly one tractor to every other farm. You can travel for days in the rugged fjord country without seeing a house with inside plumbing, a self-propelled piece of farm machinery, an electric washing machine, or a 1958 truck; yet in the rich, level, southern areas every farmhouse will have hot and cold running water, electricity, and some of the other modern conveniences. Not in the richest regions, however, will you find, as in the United States, one farmer in eight with a gross income equal to $10,000 a year.

For comparison we cannot use our measuring stick; we must use theirs.

Are their walls tight? Do they eat well? Are their clothes warm? Are their children well educated and do they get good medical care? By these standards, the Norwegian farmer has one of the highest standards of living in the world and he has improved his situation under cooperatives. The very economic nature of his country makes private enterprise such as we know it difficult for the individual producer because farms are so small and marketing channels are slow. Imagine a small country of 114,000 farms, half of which are 8 to 12 acres, and only one-quarter are over 25 acres. Of these "larger" farms of 25 acres and over, a spread of 200 acres is a rarity.

As every farmer quickly understands, this can mean a nation of small farmers with small hope for future growth and so few productive acres that the cost of buying new, modern machinery is a hardship.

The situation worsens with the geography of the country, whose seacoast is slit every 30 miles or so by an inlet, or fjord, that stabs inland as much as 120 miles. As a result, transportation goes by the spokes of the wheel, almost never the circumferential way. Last, the scenery of the country can best be described by a touring American vo-ag student from Kansas, who wrote his sister in Belle Plains:

"The scenery? Breathtaking.

"Can you see far? So far and with such beauty that it is beyond truth itself.

"The land? Perpendicular!"

Although there are occasional valleys of level land, and small, flat, fertile plateaus, almost any view includes a mountain, often snowcapped. Some farms are split—5 acres of plateau, and 5 acres of hillside, on the slopes of which hay is grown, and, after

Jon Sundby, "Grand Old Man of the Scandinavian Cooperative Movement", a farmer of Norway who twice served as Minister of Agriculture, was a leader in the movement to weld the local co-ops of Norway into a national organization. He lives on the ancestral farm near Oslo.

Norway is far from being the only European country whose co-ops dominate the agricultural picture. In Sweden, Finland, Denmark, Ireland and other countries the co-ops play a similar role. Osmo Saby, Sweden, has 100 acres under plow, 225 in forest, and 30 acres of permanent pastures, a large farm for Sweden. He owns a self-propelled combine for his 20 acres of wheat. He milks 20 cows, and has recently gone into the hog business, purchasing gilts from the swine co-op. His entire operation is cooperative—he sells his grain, milk and meat to the co-op, buys his fertilizer, machinery, and seed from a co-op. He is a member of a consumers co-op and his wife buys all her household needs from the local branch. His production per acre and per cow is high—last year his cows averaged 13,000 pounds of milk with 485 butterfat. He has irrigated his crops and pastures for many years, installing a pump and a motor in a barge which he tows up and down the shore of a lake bordering his fields. He employs two full-time laborers and an apprentice.

cutting, is carried down to the lower level farm by cables. There it is hung on wires to dry like wet wash.

Co-ops came to Norway, then, not because of greedy cartels, or vicious market speculation, but because enterprise wasn't quick enough to lend a hand to the small, doughty farmer who needed some way to get his crops quickly over mountainous terrain, and to store them for better prices in the short seasonal periods of plenty. The local food handlers didn't think in terms of instant national marketing, but only in terms of buying food wholesale for their nearby retail customers. The co-ops served a need at a time when no one else offered practical help. Soon they were doing more than marketing. They bought farm supplies and resold them to the farmer; they evaporated milk and turned potatoes into starch and they went to bat vigorously for farm subsidies from the government.

While private industry, in time, might have caught up with the situation, the lot of the Norwegian farmer has surely improved with the co-ops, for without them he would have a smaller national voice. With the aid of the co-ops in times of market glut, he is able to store his foods either in cold storage, or by freezing, evaporating, or canning. And he is able to pool his small produce into units commercially profitable.

In the case of livestock, the co-op packer "holds" cattle on feed for as long as three weeks until the market catches up with the supply. In time of food scarcity, the crops are sped to the deficit markets.

Why then isn't the farmer rich? He has one of the highest returns per acre in the world. His main problem is that he has too few acres. He is also hemmed in by the creature of his efforts who keeps a-building milk evaporating plants (one of them has a capacity of 7,000,000 gallons a year), 27 slaughter houses, innumerable country egg receiving stations, a tinning plant for milk pails and coolers, saw mills, 10 potato-starch factories, 22 distilleries, fertilizer and feed factories, and an agricultural bank.

On the home front have appeared a few cooperative stables for cows, not unlike our own developments in Utah. The co-op builds a common stable, and each member must deliver his share of hay, root crops, or feed concentrates to feed the animals. This brings labor-saving devices to the farmer that he never had before. A rather new development on the home front are machine stations, where cooperative-owned machinery is passed out to small farmers who otherwise could never have such power on their farms.

The co-ops distribute their profits back into the welfare of the farmers who own them, through continually extending greater service. The farmer gets a little better price for his product, but the only consolidation of wealth that he sees is the better facilities and expanding bureaucracy of the co-op. His standard of living continues to improve and is "good" compared to where it came from, but the wealth of the co-ops in terms of equipment and buildings has not worked its way down into the farmer's pocket, and it is unlikely that it will.

Meanwhile, the farmer is stronger politically. He is represented at his national government by farm cooperative organizations of real lobbying power which, to preserve their own entity, are unlikely to let him down. To buttress any lack of efficiency on the part of the co-ops in bringing the farmer what he will regard as a fair price, these organizations have put through the national government a farm subsidy deal, whereby on certain products, when the price goes below a given level, the government makes up the difference between the accepted price and the national market price.

The farmer's equanimity in his future depends on his continuing love for his way of life, in which no man is his boss and few men are his physical peers, rather than in any sudden material upturn.

Jon Sundby, Co-op Farmer

For a personal story of how cooperative farming affects daily life, you can hear it direct from one of the men on top.

White-thatched, blue-eyed, straight as an arrow at four-score years, Jon Sundby looks back on a lifetime of service to Norwegian farming. Because of a few years of youthful adventuring in the wheat country of the United States, he is in a good position to explain Norway's farming system.

"I belong to seven cooperatives," he says, "and every move I make on this farm is directly or indirectly connected with the system. To understand our cooperatives, you have to understand Norse farming.

"Norway is a rugged country of small farms," he continues, "sixty per cent containing less than twelve acres, and only ten per cent more than forty. Most of them are worked by their owners. How can an American farmer believe that a family can be supported on twelve acres or less. But the Norse do it—by combining an unbelievable thrift with dairying.

"Even in the old days, the Norseman was a dairyman. He put up a big crop of hay for the long winter; he had a few goats, and he fattened a pig or two on potatoes, and filled

The self-propelled vegetable seeder (below) was developed by the experiment station of the national cooperative in Sweden. It drops one seed at a time in ten rows at a trip. Dairying throughout Scandanavia is nearing the 100 per cent mark as a cooperative movement. Here (right) Irish farmers make their daily delivery of milk to the creamery. They will take home the whey from their milk, feed it to hogs and poultry. The Irish farmer has little machinery.

his cellar with cabbages and roots; his womenfolk made the clothes for the family; he worked in the forests in winter while his family huddled about the big fireplace for warmth. But the Norseman was never hungry, for he had his cheese, milk, and butter, his pig, and an occasional calf to butcher, his potatoes and cabbage. His wife made butter and cheese; a little of this was sold, but the quality was poor and there was only the local village market."

Jon Sundby believes that the Scandanavian farmer was always a little better off than most European farmers, but still his lot was hard and his standard of living low.

Standing in front of his columned two-story home, with a steep-slanting, red-tiled roof, Sundby describes the early beginnings of the cooperatives. "Although dairy products have always been our major source of income, only a few farmers produced high-grade butter and cheese. It took several days to accumulate enough cream for churning, and the problem, of course, was to keep the cream fresh.

"Cooperatives were our logical solution. By assembling small lots of milk daily, a sufficient volume of fresh cream could be obtained for making premium products.

"As long as 100 years ago, these cooperatives were spotted pretty well all over Norway, and were doing a good job locally. Even back that far, farmers started purchasing farm supplies cooperatively. The operation usually took the form of pooled orders for farm supplies. This was the beginning of the present cooperative purchasing program, which now handles most of the buying of supplies for farmers.

"The next cooperative venture came about when egg producers in surplus areas began marketing their eggs together. In Norway, some sections produce a surplus of eggs the year around; others only part of the year. Still other areas are always deficit. The private merchants lacked branch offices and cold storage facilities, and were chiefly interested in the local sale. The cooperatives soon remedied this situation.

"Cooperative livestock marketing followed. The same farmers who were mak-

Scandinavian farmers grow bumper crops of hay. Here (left) one man drives while a second keeps the sickle bar clear. When the dairy herd is taken to mountain pastures, a portable outdoor milking parlor (below) goes along. The piece of equipment suspended from the roof weighs the milk.

ing a success of their dairy cooperatives organized to sell their hogs and beef. They used to sell their animals to buyers traveling through the country, and the animals passed through several hands before being slaughtered. Cooperative slaughter houses cut out several middlemen and saved their profits for the farmers.

"By the time of the late 1920's there was a cooperative for anything the farmer wanted to buy or sell. Under the cooperative set-up the farmer was better off than when he operated as a free agent, but there was still a good deal of competition among the individual cooperatives. There were too many of them and many were inefficient. When the Big Depression began, wrecking the agriculture of the world, Norway, an agricultural exporting country of only 3,000,000 people, was hit hard. Many of us felt that what was needed was a strong central organization to integrate the whole of agriculture, from the cow to the package of imported cheese in the American housewife's market basket.

"In 1930 I was one of a group who stumped the country, talking to the farmers and the directors of the local cooperatives. Our biggest job was to persuade the local cooperatives to release some of their precious freedom to a national organization. One of the first moves of the national organization was to cut the number of dairies from 600 to about 400. Then we presented a plan to Parliament. The first step was the creation of a Marketing Board. This Board ties together all the agricultural organizations in Norway to promote the sale of farm products, milk, butter, cheese, eggs, meat, furs, fruits, forest products, and vegetables, through the cooperatives.

"The Marketing Board of ten members is appointed by these organizations: The The Royal Norwegian Agricultural Society, The Norwegian Cooperative Meat Marketing Association, The National Federation of Norwegian Milk Producers, Norwegian Egg Pool, Gardeners' Marketing Cooperative, Norwegian Fur Breeders' Cooperative, Norwegian Farmers' Union, Norwegian Farmers' and Smallholders' Association, the Federation of Norwegian Commercial Associations, and the Federation of Norwegian Consumers Cooperatives. The Board meets once a year in Oslo. Once the prices, the subsidies, and the levies have been set, the government steps out and the co-ops take over the administration.

"Under the Marketing Board law, a marketing tax is levied on the following products: milk ¼ ore per liter (0.13 cent per gallon); meat and eggs, 5 ore per kilogram (31.75 cents per 100 pounds); furs, fruits, and vegetables, 2 per cent of their value.

"The various funds derived from the marketing tax are the property of each individual agricultural cooperative marketing federation. They are, however, administered by the Marketing Board. They may be used only for regulating the market and with the approval of the Marketing Board.

"Let me tell you," continued Sundy, "how this works out for the individual farmer. Take the dairy cooperative. I have a share in the cooperative. That share is a part of the farm, just like the barn. I can't sell it separately. It is little more than a permit to partake of the services of the cooperative. My milk is delivered twice a day to the creamery—we have a cooperative pick-up wagon, but in some places the farmer delivers his own milk. The creamery processes the milk—some going on the market as fluid milk, some into cheese, or butter, and some into canned or powdered milk. A tax is levied on each gallon, .13 of a cent, which is used mainly for leveling out prices throughout the year. I also receive a subsidy, the amount determined by the Marketing Board and paid out of government funds administered by the Board. This amounts to one to four cents a liter.

"How the Marketing Board arrives at the price I get for my milk (or potatoes, eggs or pork) is a very complex operation. Prices are controlled in about the same way as the prices of milk or wheat in America, with equally as many factors coming into the picture—size of crop, surpluses if any, world market, supply and demand, speculation, the export and import situation.

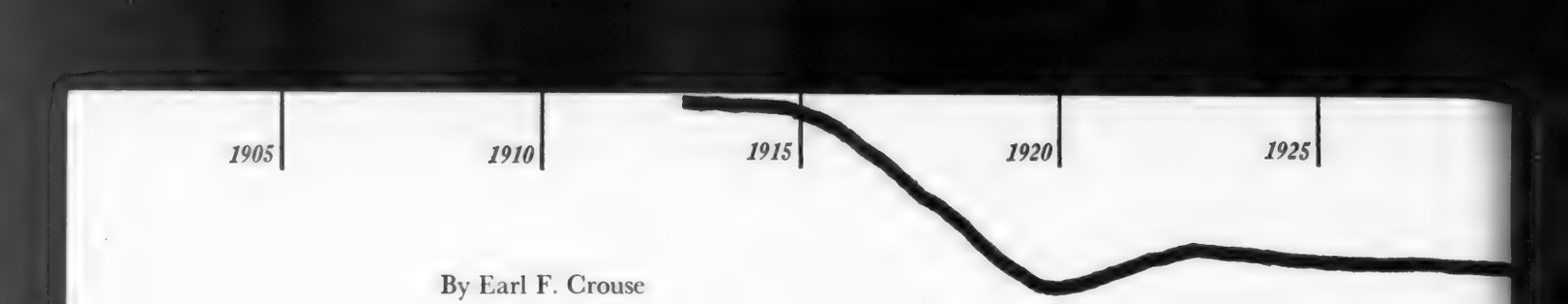
"I for one am not satisfied with what I get. I suppose I'm very much like farmers the world over in that respect. As I see it, our cooperative system gives us a slight edge on the free-enterprise system—our quality is better, our marketing is more efficient, and our exports are better regulated, and our net profit on a single gallon of milk is somewhat higher, in proportion, to what the American farmer gets. But in America, you have 95,000 dairies with 30 cows *or more;* in Norway we have few dairies; almost all have *less* than 20 cows.

"I attend the monthly meeting of our cooperative where we discuss infringements, if any, of our regulations, and the management. Each year we elect directors.

"I am also a member of the Meat Marketing Association, the Egg Pool, the Gardeners' Marketing Cooperative (for my potatoes), the Forest Products Coopera-

(*Continued on page* 109)

The acid soils of Scandinavia require constant liming to grow good hay. Lime is supplied by the co-op, spread by co-op trucks. Here (right) two high-powered spreaders are making short work of a twenty-acre field.



By Earl F. Crouse

Should I Buy

The price of land reflects closely the purchasing power of the dollar. As the value of the dollar declines the price of land rises and vice versa. The value of the dollar, like other commodities, is determined by the interplay of supply and demand; as the supply increases, without a corresponding increase in production, its value drops. Money supply, since the severance of the dollar from any commodity standard, is based upon debt, particularly the debt of the Federal Government. And the size of the national debt is determined by the expenditures of the government, more especially by the excess of those expenditures over income. So—as government spending increases without a corresponding increase in government income from taxes or other sources, the size of the national debt mounts, this pulls up the money supply and down comes the value of the dollar.

The relationship between these factors is dramatically shown in the graphs on these two pages. The top chart plots the purchasing power of the dollar (1935-1939 = 100). It has been in a steady decline since 1940. As of July 1, 1958, it stood at 48.7 cents based upon the consumer price index of the United States Department of Commerce. The bottom chart shows the course of federal spending, national debt and money supply. The national debt stood at an all-time high of $276.4 billion on July 1, and has been climbing ever since. The supply of land is fixed, the money supply is increasing. Therefore. . . .

A RECENT Hollywood gossip column carried the following item: "Back in the 1930's, Joel McCrea bought a 2,400-acre ranch near Hollywood for $50,000—with just $5,000 as the down payment. Just the other day a syndicate offered the actor so much an acre that he'd realize almost $10 million if he decided to sell."

There is no use gasping in amazement and asking, "How long has this been going on?" The question is, will it continue?

Forget the thirties; they were a time of extreme economic distress. Most of us who might have been able to recognize a bargain at that time would not have had the cash to swing the deal.

But look what has happened just since 1940. At that time a man could have bought a whole section of good Illinois farm land for what 180 acres will cost him today. Farm prices have tripled in the last 18 years. They are half again as high as in 1950 when the March 1 index of land values came within spittin' distance of the 1920 peak.

This time, instead of breaking as they did in the 20's, land prices kept right on climbing. The rate of advance since 1950 has averaged better than 5 per cent per year, compounded semi-annually. This was on top of whatever earnings the farm produced during the period. The March 1, 1959, report of land values will show a continuation of the uptrend.

For a time it looked like the business recession of 1957-58 might halt the upward spiral of land prices. But, the recession is now mostly a memory, farm output set new records in 1958, and net farm income was the best in years. Federal Reserve Banks began as early as August to raise interest rates in anticipation of more inflation.

The federal deficit for the current fiscal year is now estimated at $12 billion pointing toward an ever cheaper dollar.

Some folks shake their heads and say, "This can't go on!" But, who is there to call a halt? The Republican Administration was elected on a solid money platform and took office six years ago, come January. For whatever the reasons, they have managed to outspend their predecessors. Even this has not been enough to satisfy the demand for still more government spending.

Our approach toward the welfare state is more rapid than most will admit. We have social security, wage and hour laws, government supports and subsidies, road building and just about everything else that the fertile mind of man can imagine.

This means that the stage on which the future of land prices is to be played has a strong inflationary slant. Some government money managers have talked of this in terms of 3 per cent per year. If true, future land prices will reflect this decline in the value of our money. Like any looking-glass picture, the image will be reversed. Every decline in the value of the dollar will show up as an increase in the price of land.

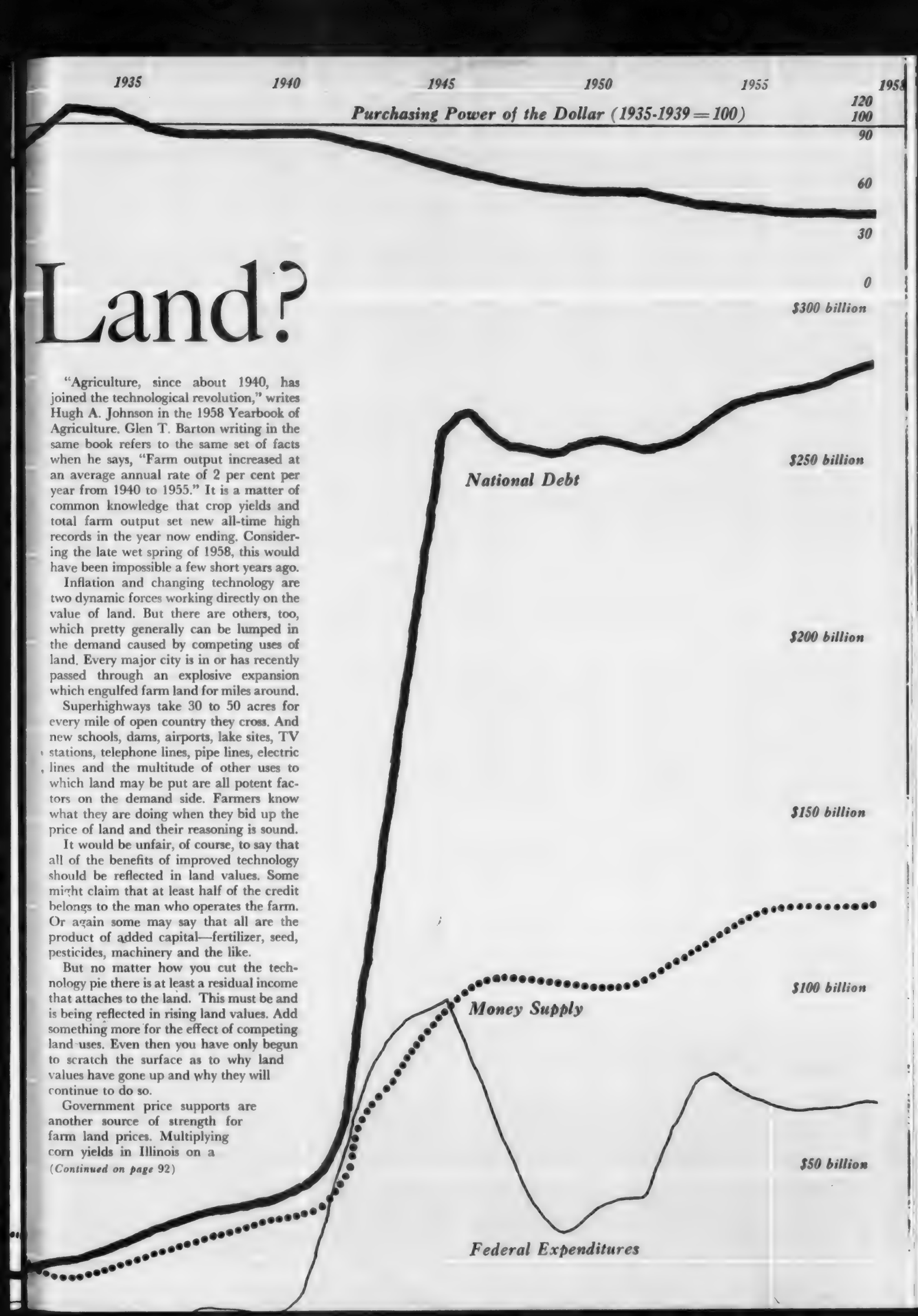
The graphs extending across these two pages dramatically plot the downward trend of the dollar's purchasing power and the action of the fiscal factors which have been largely responsible for that decline. As government expenditures increase without a corresponding increase in income, the national debt rises, money supply goes up with it and the dollar shrinks.

Land prices must also take into account improving farm technology. This is a necessity if fewer and fewer farmers are to feed more and more people with no increase in tillable acres. Eventually we must face the fact there are no new lands available to offset the expansion of our cities and the extension of the superhighways.

These factors force one to the conclusion that good land is not high priced at all. In fact, by old standards, land prices are still in the bargain basement. Farmers who have been buying land have once again demonstrated that they can play economics by ear better than most professors.

She Ain't What She Used to Be

Farming is a business of production economics—combining land, labor and capital. You can no more have a farm without a man to manage the soil than you can have a farm without soil to manage. They are inseparable in our thinking. Within this concept we find that a farm is not at all what it used to be. This fact is only beginning to show in the price of land.



Land?

"Agriculture, since about 1940, has joined the technological revolution," writes Hugh A. Johnson in the 1958 Yearbook of Agriculture. Glen T. Barton writing in the same book refers to the same set of facts when he says, "Farm output increased at an average annual rate of 2 per cent per year from 1940 to 1955." It is a matter of common knowledge that crop yields and total farm output set new all-time high records in the year now ending. Considering the late wet spring of 1958, this would have been impossible a few short years ago.

Inflation and changing technology are two dynamic forces working directly on the value of land. But there are others, too, which pretty generally can be lumped in the demand caused by competing uses of land. Every major city is in or has recently passed through an explosive expansion which engulfed farm land for miles around.

Superhighways take 30 to 50 acres for every mile of open country they cross. And new schools, dams, airports, lake sites, TV stations, telephone lines, pipe lines, electric lines and the multitude of other uses to which land may be put are all potent factors on the demand side. Farmers know what they are doing when they bid up the price of land and their reasoning is sound.

It would be unfair, of course, to say that all of the benefits of improved technology should be reflected in land values. Some might claim that at least half of the credit belongs to the man who operates the farm. Or again some may say that all are the product of added capital—fertilizer, seed, pesticides, machinery and the like.

But no matter how you cut the technology pie there is at least a residual income that attaches to the land. This must be and is being reflected in rising land values. Add something more for the effect of competing land uses. Even then you have only begun to scratch the surface as to why land values have gone up and why they will continue to do so.

Government price supports are another source of strength for farm land prices. Multiplying corn yields in Illinois on a

(*Continued on page* 92)

By Charles R. Koch

A.I. *on the range*

AS A SERVICE to dairymen, one of the universities of the prairie provinces of Canada recently scheduled a short course in artificial insemination. But of the 27 who enrolled, only two were dairy farmers. The other 25 were ranchers, an indication of the tremendous interest of commercial cattlemen in artificial breeding.

Artificial insemination, AI, as it is commonly called, is nothing new in beef breeding. Purebred beef herds have been using it almost as long as the dairy herds in which it is now a commonly accepted practice. And almost all of the bull studs maintained by the artificial breeding associations own representatives of the leading beef breeds which they stable side by side with their dairy bulls. The principal function of these beef bulls has been to serve a relatively small number of purebred cows in relatively small herds, or to produce big, crossbred calves for veal or beef when mated to dairy cows.

How to bring the benefits of AI to the range has been a problem of no small dimensions. Here, wild and wily cows roam with the freedom of deer over thousands of acres of pasture, much of which is so rough and so covered with brush that a clever cow can conceal herself from human eyes for months. Yet, forward-looking ranchers, dissatisfied with the kind of range bulls they have been able to buy, and seeking ways to reduce their breeding costs as well as to improve the quality of their product, have been experimenting with the idea of using artificial insemination. And they are making it work.

Canadian rancher John Minor (below) takes a container of frozen semen from storage. Minor used AI on a herd of almost 1,200 cows last year. Using AI it is possible to breed a whole herd like the one on the opposite page to one outstanding performance tested bull.

Mention of AI to any rancher in the West gets an immediate reaction, ranging from definite rejection to qualified approval, based in some instances on a trial on part of a herd. Then, inevitably, some one will mention "a fellow up in Canada who used it on his whole herd. I heard he had something like 3000 cows and got better than 85 per cent conception on the first go-round; something like a 95 per cent calf crop."

"That fellow up in Canada" is John Minor, a young, handsome, third-generation cattleman. Cow sense is an instinct and an art with him. Coupled with the ability to plan a far-seeing program and the determination to see it through, he has used it to make a name for himself as a successful rancher. The Post Office address of his 60,000-acre home spread is Abbey, Saskatchewan.

The estimate of 3000 cows and the rumors spread by the grapevine of the phenomenal conception rates and calf crop are gross exaggerations. Still, his results are something of an eye-opener.

His range herd this past year numbered 1400 cows. It is made up of 1000 straight Herefords and 400 Hereford-Angus and Hereford-Shorthorn crosses. About 250 head were not included in the AI program.

Using semen from three Hereford bulls and three Charolais bulls owned by the Waterloo Cattle Breeding Association at Waterloo, Ontario, Minor was able to settle 1,070 of these cows during a 42-day breeding period beginning on June 30. August 12 was the last day AI was used. After that the brood cow herd was turned out with Angus "pick-up" bulls to finish the work.

"It finally gets to the point," he explains, "where you get so few cows coming in heat that you can't afford to keep a crew tied up to handle them. At that point the only thing to do is to kick them all out with the bulls."

All the bulls Minor used, in fact the bulls used by most ranchers feeling their way into the AI program, are progeny tested animals. The thinking is: Why use an unknown when it is just as easy to get service to a bull whose get are predictable for growth, gainability, and feeding efficiency?

This was John Minor's second year with AI. A declining calf crop led him to it. "In 1957," he points out, "we came up with 300 dry cows out of a herd of 1400. We'd had short calf crops for two or three years before, too, and I was getting a little afraid we might have a touch of Vibriosis among our bulls. Whatever it was that was doing the damage I felt AI might be a good weapon to check it.

"Long before our '57 calf crop began to hit the ground I had started inquiring about AI and trying to work out a plan for using it here. I went over to see Harry Hargrave, head of the animal husbandry section of the Dominion Experiment Station at Lethbridge, and I got in touch with other ranchers who had tried it. Harry gave me a lot of encouragement. So did Dr. Jim Henderson, of the Ontario Veterinary College at Guelph. But I probably would never have tried the program on the basis of the information I picked up from my other sources.

"One ranch I visited, for example, was a purebred outfit with the cattle all confined in small, neat paddocks where it was a cinch to watch the cows. I knew it could never be

(*Continued on page* 120)

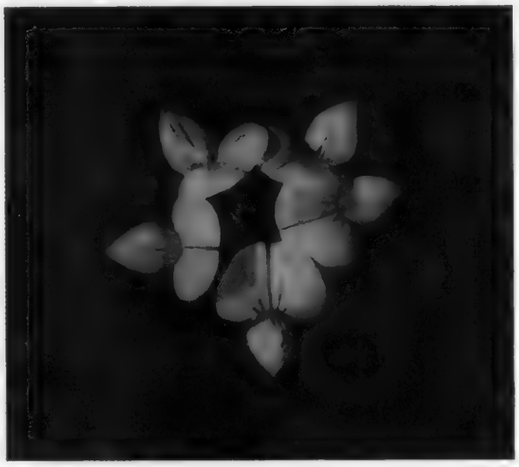
A.I. *on the range*

Artificial insemination is a valuable tool for the man whose ranch provides the proper physical set-up and who is willing to give the program precise and detailed management.

It gives him access to better bulls; makes his calf crop more uniform; provides a more concentrated breeding season; is a weapon in the fight against Vibriosis and other genital diseases; helps him breed better herd replacements; and it is possible that he may cut his breeding costs.

It is the perfect complement to performance testing. By keeping careful weight records on his calves he can select his best cows and breed them to bulls whose get have outstanding records.

But it throws a new and inescapable burden upon the rancher himself, day in and day out, for the entire breeding season; and it demands careful and patient handling of the herd. Anyone unwilling or unable to accept these conditions had better leave his breeding to his range bulls.



For a pretty girl of fifteen, birdsfoot trefoil and clover have much the same purpose —a place to lie and dream. A steer would be more interested that the trefoil remains palatable even to the full bloom stage, when the symmetrical yellow flowers overlay the field. The pods of seed, spread on the stem like chickens' toes, give this unpredictable crop its name.

Birdsfoot Trefoil

This important legume, erratic, but showing considerable promise, may take a boost from the Conservation Reserve Program

"IT'S A CROP with potential," said Howard Kaerwer. A tall, broad, round-faced man from the research department of Northrup King, Minneapolis, he pointed last fall to some volunteer trefoil on the side of the farm road on the Company's 250-acre test plots. "Look at that," he said, "it's been there for years; you'd think it would be easy to produce a crop, yet to grow trefoil in a field a man needs both skill and patience.

"One of its faults," said Kaerwer, "is the difficulty in getting it started. Very often the first seedling year a farmer will become discouraged and plow it down—when in fact he has a fairly decent stand, but can't see it for the rest of the debris."

The seed rate for birdsfoot trefoil varies. "Four pounds, most people say," said Howard Kaerwer, "but I'd throw in a little more. With a companion crop you have to watch very carefully you don't give the trefoil too much competition. In spring, three-quarters of a bushel of oats is plenty, and it must be pastured off—or just clipped—early. The oats serve only to control the weeds; neither must be given a chance to compete with the trefoil."

That is one man's comment on the temperamental habits of birdsfoot trefoil. Nearly everyone has a different view. Even more strange, most of those views are based on actual experience with this comparatively new legume. Believe it all, and you have to conclude you are talking to crazy farmers, or you picked a crazy crop. It definitely is the latter. Birdsfoot trefoil, as grown today in the United States, is as erratic as a leaf in the winter wind. The reason is not hard to find. It is a crop which is without truly pure strains or varieties, and any batch of seed may contain trefoil plants of widely different potential.

The seed comes as a loosely gathered strain originating from one of the broad groups of trefoil. A farmer may buy exactly the same type of seed next year and get completely different performance from it.

Besides this, there is the temperamental behavior while the crop is young. The solution to this problem seems to be experience, and that alone. There are farmers who regularly succeed with a crop while their neighbors fail. Birdsfoot is a crop you must know before you grow. How can you learn? Howard Kaerwer suggested an excellent way. "I always tell a farmer who's interested—'It takes different management from alfalfa or clover. Try a little first, an acre or so, in the corner of a field.' I've seen farms where they've done this, and the cattle come out of the barn and migrate straight over to the trefoil corner. This crop is palatable *all* the way through its growth stage, while alfalfa loses palatability when it flowers. The seedbed should be firm," went on Kaerwer, "so firm that a footprint will be no more than sole-deep. Most failures are due to loose, porous seedbeds.

"I personally feel," said Kaerwer, "birdsfoot should be allowed to go to seed once in a while; it keeps the establishment good." Here, he back-tracked. "Another good thing about the small trial plot is the way it spreads. The seeds will be eaten by cattle,

(*Continued on page* 111)

CHEMICAL NURSE FOR LEGUMES

One of the big problems in establishing a legume, birdsfoot trefoil or any other, is overcoming weed competition the first year. Commonly a nurse or companion crop, such as oats, is used to smother weeds. But this nurse crop may be as harmful to the legumes as the weeds, except that a farmer gets some economic value from it.

For about five years, the USDA and several state stations have been testing chemical herbicides to cut weed competition during the critical early growth of legumes seeded in the spring. Two types of weeds besiege the legume—the grasses and the broad-leaf weeds.

One of the chemicals tested, Eptam, will control both these types, although it is more effective against grasses. It was tested last year, used as a pre-emergence spray, one to two pounds disced into the top two inches of soil just before the legume is seeded. This chemical has a 90-day label—the crop may be grazed or cut for forage when 90 days have passed after application. The manufacturers hope this waiting period will be reduced in the near future.

Other trials have involved two herbicides, one against the grasses, the other for the broad-leaf weeds. Dowpon at two to four pounds per acre gives good control of annual grass weeds. 4(2,4 DB) is used as a post-emergence spray for the control of weeds such as lambsquarters and pigweed.

The time of application is critical, depending on the size of the weeds. Dowpon is most effective when the weedy grasses are in the two to three-leaf stage. Dowpon and 4 (2,4 DB) are best applied four to five weeks after sowing the legume. They may be applied together in one application.

One chemical has no restrictions to its use. This is M.C.P., which can be used to control broad-leaf weeds in mature legumes—usually a pint per acre applied in water when the legume is dormant—i. e., in the winter. M.C.P. may harm a legume if applied in the active growing stage.

In most of the tests, the chemicals gave better first and subsequent-year yields of the legume than did a nurse crop. However, there are disadvantages. The chemicals which kill grasses cannot be used except with a pure legume stand. Where a companion grass is sown, only 4(2,4 DB) could be used. Besides this, the cash value of the nurse crop is lost, and the chemicals are more expensive than a nurse seeding, costing at least $5 an acre, not including application. But the choice depends on the returns from the work rather than the cost of doing it.

Again, it should be emphasized these chemicals are not federally approved for use of any crop that is to be fed to livestock. If a farmer obtains them—not all are available—he may use them *only* in two ways. Other practices are in the research stage.

First, the chemicals can be used if the crop is not to be harvested for a year. This would allow their application to legumes, like trefoil, seeded under the conservation reserve. The second use is on a crop that is harvested for seed the same year, but this crop must not be cut for feed or grazed during this first year.

Dowpon is made by the Dow Chemical Co.; Chipman Chemical Co. handles 4(2,4 DB); Eptam is made by the Stauffer Chemical Co., and M.C.P. is made by the Monsanto Chemical Co.

With 12 farms and 1300 cows, this Vermont dairyman claims that the secret of his success is

Production Per Stall

This line of cows—not more than 60 head—is expected to produce a ton of milk a day the year 'round. If they do not, the milker looks for a new job; if they beat the quota, he gets a bonus. The rule of thumb in feeding is "Give 'em all they'll eat. If they don't make milk they'll make beef."

EARL HACKETT, wiry little Vermont dairyman, took off his hat, ran his hand through his sparse wisps of grey hair one day last summer, and looked at his tenant in amazement.

"I want that cow back," the man was saying. "She's a good one. She's making me money and she'll make you money, too, Mr. Hackett."

"Well, by golly, if that's the way you feel about her," Hackett replied, "we'll just catch that beef wagon and unload her. You weren't around when we got to the farm and she looked to me like she was awful stiff and sore. I figured she couldn't spin a thread anymore so I told the boys to take her."

That episode nails down the essential features of Hackett's 12-farm, 1300-cow dairy operation in Orleans County, Vermont. It is a "production per stall" deal, as he calls it, in which he assigns a quota of a ton of milk a day to each of his men, breaks this down into a quota per stall or per milking space, culls rigorously, buys all his replacements, and pays his help a bonus for every hundred pounds produced over the quota.

The scene referred to was a result of the workings of this system. Hackett guarantees his men good cows. If one falls below standard he has no hesitation about shunting her off in the "beef wagon." They are all big animals, mostly Holsteins—he added some Guernseys to the herds last summer to bring up the butterfat production—and are well fed so that culls have a high salvage value. The one in question he had mistaken for a poor producer and she was on her way to the butcher.

The quota and bonus features, on the other hand, keep the men on their toes to the point where they know their cows as well as their children, handle them with extreme care and hold on to the good ones with jealous tenacity. While this particular cow was a bit stiff, she was a good producer and the man milking her was eager to keep her.

The Hackett dairy enterprise has been a long time a-growing. Its bigness and its management techniques have been inspired by the first-hand observations of California agriculture Hackett made during several visits to the Coast in recent years. Its success depends almost entirely upon the man in the driver's seat.

"I used to think I was a good farmer until I went to California," he says, "but I really learned things out there. That's where I learned how good this bonus system is; how it's smarter to buy cows than to try to raise them; and how your men will do a better job if they don't have to help in the field.

"Two years ago these farms were producing about 18,000 pounds of milk a day. Today with the same farms and the same number of cows, we're putting out right around 38,000 pounds a day and have gone as high as 44,000 pounds. And it's all the result of the ideas I picked up out west.

"But when you come right down to it," he continues in his Vermont twang, "there's really nawthing new about our methods. It's just that we weren't using our heads before. We were like the old fellow who told the magazine salesman he wouldn't subscribe because he wasn't doing half the things he already knew he should do. That's exactly the way it is with most of us dairymen. We don't use our heads.

"As for natural advantages, I'll take the Northeast against California any day. You can't beat our pastures, the land is cheaper, we're close to good supplies of Canadian grains and we have a good market."

But even all those advantages do not add up to success by themselves. It takes a man of energy, imagination and experience to put them together in the right proportions and keep them flowing. That is Earl Hackett's role. He plays it to perfection. He is a

Paul Muni type in size and build, if you are a movie fan; if not, let's just say he is short and of medium build, quick in his movements and with a pair of sharp grey eyes which seem to be continually translating objects into ideas.

He walks with a cane, the result of an accident five years ago which found him on the under side of a ton and a half cultipacker, and left him incapacitated for months. But the "boys" on the farms will tell you that while he was still on crutches this gritty specimen of the Yankee breed, already past the three score mark, kept them all going at a pace that had their tongues sunburned.

A barn on one of the farms he bought about that time, a huge structure, at least 60 feet to the eaves on the back side, had a bad tear in the roof. The insurance company had offered an interesting premium to any carpenter who had the nerve to scamper up a ladder and do the repairs. But there were no takers. Finally, Hackett himself, crutches and all, went up that ladder, and while he couldn't swing a hammer he was able to devise a plan by which the repairs could be made from the inside.

On a neighboring farm—also Hackett owned—is a big stanchion-type barn which was rebuilt in 18 days after its predecessor was burned to the ground with a loss of 54 cows "on the opening day of the deer season" in the fall of 1957. "It was so cold when we painted her, we had to wear mittens," says the grey-eyed impresario, "but we were shipping our usual quota of milk from that place within a month after the fire."

Such stunts have long ceased to amaze Hackett's neighbors. After all, a man who once owned as many as 56 farms and still rents 83 apartments in his home town of Derby Line, and in the adjacent towns of Derby and Newport, and who has also dabbled in sawmills, real estate developments, run a dance hall, been mayor of the town, president of the local Soil Conservation Committee, president of the Fair Board and a director of the local Federal Land Bank, is fairly well known, and his exploits become commonplace on the home grounds.

Hackett's first professional venture after leaving the home farm in his youth was as a milk hauler. For nine years he "drew" milk the 10 miles from Derby to Newport, by wagon or sled as the weather dictated. Eventually he converted his sled into the "Newport Express" by the addition of a covered seat for paying passengers.

Paternal solicitude shifted him out of the transportation business. One day, he says, his father asked him, "For Pete's sake, Earl, don't you know how to make a dollar without so much hard work? I've always been able to make a good living but I let the other guy do the hard work."

That was when Hackett, fils, took to swapping. "I swapped cows, horses, farms, tools, wagons, houses, anything at all," he says. "The only thing I wouldn't own was a really hilly farm. One day when I was just a kid the team ran away with me on the side hill and turned the mower upside down. I told my father right then I'd never buy a farm but what I could ride over every inch of it. And that's always been my first thought in looking at a place." Which only points up the relativity of human appraisals. Some of the fields Hackett calls rideable would petrify a tractor jockey from the flat lands of Illinois.

"This is the last summer I'm going to put up hay!" Dairyman Earl Hackett emphasized his determination with a flourish of his cane as he directed the operations of a field crew last August. "I've got more important things to do. When you put up your own hay you take the bad along with the good. When you buy it you take only the best."

Don't Raise 'Em, Buy 'Em

Hackett's trading ability, of course, gives him a distinct advantage in an operation where he buys all his replacements. He figures buying them is a lot cheaper than raising them, even at the $300 to $350 per head he is currently paying for good cows. He is a familiar figure around the sales barns but buys most of his replacements directly from other farmers, many of them in Canada. Anyone who has a cow to sell or knows where there is a cow for sale sees Earl Hackett first.

If he's buying a herd from a dairyman going out of business Hackett wants to see the milk slips and know how the man feeds. On individual cows he likes to see the production records if such are available. Besides this his selection standards are relatively simple.

"That first look is important," he says. "I want a cow that gives me a good general over-all impression. Don't ask me what that is. It takes a lot of time to learn it; you can't pick it up in three or four months. I don't like heifers. It's too easy to get one that's good for nawthing. I like a cow that's had two, three or four calves, one that is not nervous or high strung. You get one that's high strung and she goes to pieces when you start putting the feed to her. To guard against disease, I seldom buy a cow with a discharge or a dirty tail. I always check for foot rot.

"And I like rugged cows, the kind that carry a good bit of beef. If I have to sell them I can always get my money back."

To be able to replace a cull with a good

producer at any time Hackett has to maintain a reserve pool of cows, a few extra on this farm, a few on that farm. Besides this he operates a kind of maternity farm where most of his dry cows and close-up springers are held until they have come into production and from which they are distributed to the various milking lines as needed. He also has a quarantine farm where he transfers individuals which react suspiciously to TB tests.

Calves are sold before they are a week old. The calf truck makes its pickups twice a week. The $18 to $25 a head the vealers were bringing late last summer was a handy dividend in addition to the $4.90 per hundred for milk.

The turnover in the Hackett herd is between 20 and 25 per cent, from 260 to 325 cows per year, a good-sized herd in itself. The average cow lasts 4 to 5 years.

Practically all the culls go for beef. He buys them big to start with and feeds them liberally. There is never a thin cow in the line. In an area where finished beef cattle are a rarity, they bring a good price when their milking days are over. Last autumn they were averaging around 20 cents a pound, some as high as 22.

Mastitis in the Man

The disease problem is one of the first things that flashes into a dairyman's mind when he thinks about buying replacements. "I suppose mastitis gives you plenty of trouble. I guess you buy aureomycin by the carload," a visitor to one of the Hackett barns observed last fall.

"The best cure I ever found for mastitis was putting my men on commission," the Yankee snapped back. "There's more mastitis in the man than in the cow. You give a man an incentive to keep his cattle in good health and you'll not have too much trouble. When we do get a case of mastitis, we put her in the sick line right away. We milk those cows last. And we never put any antibiotics in the udder for mastitis. We give them a shot in the muscle. Once in a while we will put a shot of aureomycin in the udder, but only to dry a cow up.

"Another thing," he continued, "we don't fool around any more with cheap or used milking machines. I used to go out and buy used milkers. I could pick them up real cheap. But that was just plumb wrong. A good cow deserves a good milker."

Hackett himself takes care of a large part of the veterinary work on the farms. There are few professional DVM's who do a neater job. He has had enough experience to know when he is up against a case he cannot handle and in all such cases the trained man is called.

All They'll Eat

Grain is the base of the Hackett feeding program. Most dairymen would consider him absolutely profligate with his ration. The milk-grain ratio has no standing in his barns. "Feed 'em all they'll eat," says he, "if they don't make milk they'll make beef. Grain doesn't burn a cow out, it's the high protein that does the damage. I like to see a cow giving 50 pounds of milk a day eat 28 to 30 pounds of grain; so much grain she'll go mighty light on the hay. I don't expect my cows to eat more than a ton of hay each all winter."

His rations run 14 per cent protein or lower. A typical mixture would be somewhat as follows:

400 lbs. oats
400 lbs. barley
400 lbs. bran
300 lbs. gluten
300 lbs. beet pulp
200 lbs. linseed oil meal
300 lbs. molasses
salt and minerals

But woe betide the feedman who would dare to put screenings in Hackett's feed. "They put nails in the cow's coffin," he warns. And it's one of the reasons he is anxious to mix his own feeds.

He buys all his grains, and up until this fall he had been having his ration mixed by the various dealers from whom he purchased his supplements. The first of October, though, he put his own feed mill in operation and began to turn out his ration at a cost of about $50 per ton, a substantial saving over what he had been paying.

He also is planning to buy all his hay and turn his farms completely to pasture. His reasons for this step are two: (1) He personally directs every phase of activity on the farms and feels he can use his time and energy to better advantage elsewhere than in the hayfields. "I can't get all tuckered out making hay," he says. (2) "When you put up your own hay," he points out, "you have to take the bad along with the good. When

Sawdust for bedding (right) comes from a mill near Montreal. A jeep makes quick work of spreading it through the loafing barns. Milk is picked up daily (below). At the big farm in Derby where three bulk tanks are used, the smaller truck takes the milk from the tanks, then it is transferred to the big semi-trailer, already partly filled with milk from other Hackett farms, for delivery in Rhode Island. Earl Hackett is a neat practitioner (opposite page) as he binds up the foot of a cow he has just treated for an infection.

you buy it you can pick and choose and take only the best." Good Canadian hay this past summer was costing him about $17 per ton, plus the cost of hauling and an import duty of about $1.24 per ton.

The Hackett cows get no silage. He has used both horizontal and upright silos, but it takes time and labor and equipment to make silage, factors he feels he can put to more profitable uses or eliminate altogether; besides, he has an aversion to silage because of its tendency to flavor the milk.

The silos on the Hackett farms are now kept filled with sawdust which is used liberally for bedding. This is procured free of charge from a mill near Montreal. A man and truck are kept busy hauling it in at the rate of about 1,000 square feet per load.

"Two years ago," says Hackett, "we didn't use any bedding at all in our stanchion barns. The sawdust has saved us a lot of udder trouble."

Loose Housing vs. Stanchions

The barns on the Hackett farms are of both the loose housing and stanchion types. Hackett built his first pole barn in the fall of 1956. Since then he has put up four more and is planning to start construction on another three. The first was a tremendous thing 330 feet long by 62 feet wide, constructed, like most of his buildings, out of used materials salvaged from his various properties. It was built to augment the big stanchion barn on his headquarters farm at Derby where he now milks from 240 to 260 cows. This loafing barn was built with the south side open but it did not take too many sub-zero days to convince Hackett that his cows needed more protection than could be provided by only three walls and a roof. He soon closed the fourth side leaving a couple of wide doors to open onto the paved barn lot. Along the south side of this lot extends a covered hay rack. The doors are curtained with canvas in frigid weather so the cows can pass in and out as they choose.

Another of Hackett's theories is that a loafing barn can never be used in single harness. It needs a stanchion barn to go with it as the other member of the team. His "I don't give a darn about the cow" is not nearly as ruthless as it sounds. He keeps a sharp and solicitous eye on all his cattle and sees that they are handled with care. And he believes that some cows just

(*Continued on page* 100)

By Edwin Van Auken

IRRIGATION FROM BELOW

IRRIGATION FROM BELOW

On the 5400-acre William Gehring Inc. farm in northern Indiana, two types of irrigation are used. On the heavy, muck acres he both irrigates and drains the soil from a complex tile system below the surface. Irrigation is accomplished by controlling the water table to raise the water to the root zone. He also has 12 sprinkler systems capable of watering 3000 acres on the rest of the farm. The extra tile and tile laying needed to convert a drainage system to irrigation make this the more expensive of the two. It can be used only where soil and water conditions are just right for it. However, it requires less labor to operate, less maintenance, and has a longer life than sprinklers. Gehring believes in adapting the system to the land to be watered, but, given a choice between the two systems, he prefers sprinklers.

THERE'S MORE than one way to water a thirsty crop and William Gehring of Jasper County, Indiana, is that uncommon man who uses two entirely different irrigation methods. Just 30 years ago, Gehring came out of Chicago and gave up his work as a wholesale buyer of onions to start raising them for the market himself.

Gehring had a determination to do scientific farming and enough money to buy 320 acres of muck land at what now seems the ridiculously low figure of $60 an acre. He planted potatoes his first year and they did well. Gehring's good start was to become typical of his enterprise and the farm began to grow in size, equipment and labor force until it became one of the largest in Indiana.

Gehring is a man of action. As long as he can remember he has had more work to do than time to do it. He speaks softly and his mind goes right to the heart of any matter that demands his attention. He is seldom seen in one spot for very long and, as one who believes in delegating details, he is more likely than not to refer the visitor seeking information to his long-time aid, Ernest Munter. Gehring's intensity is reflected in the way he farms. He is convinced that land should produce to its fullest capacity and all the findings of science are his tools.

Today on his 5400-acre black earth farm, he still grows onions at the rate of 600 acres a year plus 600 acres of potatoes, 600 acres of peppermint and 3600 acres of corn, including 600 acres of hybrid seed. Sixty people, who seem to work almost as hard as Gehring himself, operate the farm the year around and the working force climbs to 300 during rush seasons. There is a fleet of 50 tractors on the holdings of William Gehring, Inc. and 25 trucks.

In his early onion buying travels through the muck lands of northern Indiana, Gehr-

A water-control box is checked before it is buried and connected with the irrigation-drainage tile. In the ground, it controls the flow to raise or lower the water table.

ing noticed the land was swampy and you farmed it at a profit only when nature smiled on you. If your crops suffered neither drouth nor flood, you usually harvested a good crop. If you had a bad year you could mire down too deep in money troubles ever to get out.

It was obvious to Gehring, once he had purchased his first marshy 320 acres, that he would have to install a lot of drain tile. He studied the slope of the field, the crops he wanted to grow there, the source of water, the drainage problem and the labor he would require.

Then he talked over the problem with Dave Harker, Indiana State Drainage Engineer, and Harker thought they could plan a water control system that would carry off excess water during periods of heavy rain, then back water up into the field when the crops needed irrigating. In this way a single system could both drain and irrigate the field. It cost a lot more than a simple drainage system but it has been doing two jobs for Gehring ever since.

But there's more to a subirrigation system such as Gehring's than figuring out ways to block up your tile drains. Recently in his office at the farm headquarters, Gehring's agricultural engineer Ernst Munter, an easy-going specialist who has a knack for solving big problems on the Gehring Farms by breaking them down into smaller ones, spread out blueprints of the mile-long field and explained the system.

Subirrigation, as Gehring does it, is simply a method of controlling the elevation of the water table beneath a growing crop. The drainage system is blocked off and water backs up in the soil and reaches the roots by capillary action. Agronomists in states where subirrigation is practiced have figured out the best height for the water table for various crops—36 inches below the surface for corn, 30 inches for potatoes, and 24 to 30 inches for onions and mint. The well-planned and well-managed systems keep the water table at these heights through the season. The roots of the crops are always within reach of water, growth is steady, and quality, say those who use the system, is high.

"First of all," Munter said, "this field is almost level, which is a necessity for this type of system. Here," he added, pointing to the blueprint, "is a big drainage ditch on the upper side of the field and another one along the lower side. We call this one on the upper side the 'feed ditch.'

"There are three main tiles running the length of the field between these two ditches. They're tapered from 6-inch tile in the upper end of the field to 10-inch tile at the lower end to handle the drainage." Munter then pointed out the laterals extending from each main line. The laterals, which are 6-inch tile, are spaced at 25-foot intervals along the mains for the length of the field.

"This feeder ditch is also a reservoir," said Munter. "Here on one end of it is a deep well and a pump which helps maintain the water level in the ditch to provide water for irrigating. In the drainage ditch down here on the lower end of the field we have another pump to pull off excess water. The lower pump is controlled by a float."

Water from a deep well is directed into a supply ditch which feeds the sprinkler system. This ditch is also used for carrying off drainage water. Stub Walker, Gehring's water control foreman, is the man at the switch.

The next essential is a method of controlling the water in the pipes so it can either be drained off the field or backed up into the lateral tile lines. This is accomplished with a system of control boxes which the farm welders put together in the farm shop from 10-gauge steel plate. These control boxes are sunk into the ground at strategic spots along the mains so that water can be deflected from the mains into the laterals.

The control boxes are like nothing in the world of nature. Most of them are cross-shaped with four box-like compartments crossed at right angles to each other around a central compartment. Each arm of the cross measures 22 by 30 inches and it is attached either to the tile mains or laterals. Each of the four walls of the central compartment has opposing slots into which plank baffle boards can be fitted to block off water at any height. This enables Gehring's water control crew to direct water through any of the tile and at any level from control boxes spotted along the drainage mains. "The bottom of the box," says Munter, "extends a foot below the main on which it's installed and this catches sediment which we can clean out once a year."

These boxes also make it a simple matter for the water control crew working under the direction of the farm's water control foreman, Stub Walker, to measure the height of the water inside the box with a steel tape.

Such systems of subirrigation will always be limited because there are only a few farming areas in the country where the idea will work. The field must be nearly level and smooth, and there must be, just below the surface, a layer of soil through which water can flow readily both laterally and vertically. Then just below this permeable layer there must be either heavy, impervious soil or a permanently high water level to hold to a minimum the loss of water through deep percolation. It's on this impervious layer that you have to build the artificial water table. Then, too, there must be an adequate source of water and a way to drain off excess water.

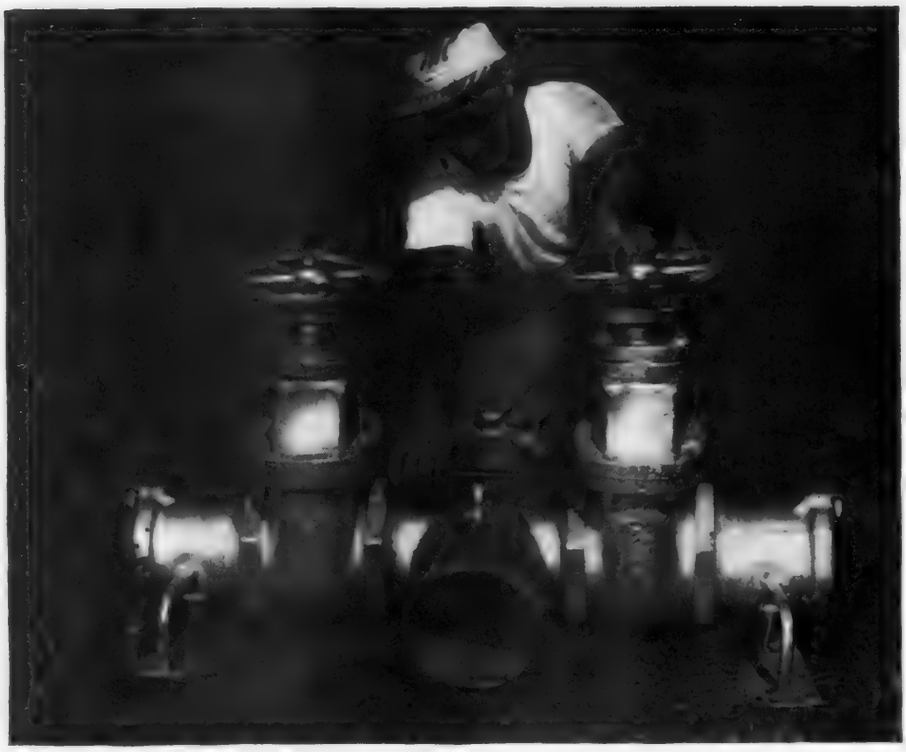
Such conditions are found mostly in muck or peat soils which were wetlands prior to drainage.

"Big advantages of subirrigation," says Ernest Munter, "are the low labor requirement to operate it and low maintenance costs. There are no pipes to move, no borders to make, no dams to put in, or siphons to set." Gehring and others who practice this type of controlled drainage for irrigation also point out that the system does not interfere with cultivation.

But the system has some disadvantages. "The original cost is high," says Munter. "A tile drainage system in this field might cost $100 an acre but this installation for both drainage and irrigation takes a lot more tile and costs closer to $300 or $400 an acre."

The Sinking Farm

Gehring's subirrigation system is a big aid in fighting subsidence, a word that is always in the back of every muckland farmer's mind. Subsidence means the surface of his drained fields gets lower every year. Subsidence has lowered some California peat lands as much as eight feet since 1922, dropping them below sea level. In the Great Lake mucklands, subsidence costs farmers about an inch of top soil a year. A tile system installed at depths of 3½ to 4 feet in one Indiana muck field 25 years ago was less than 2 feet below the surface when it



A four-way valve on the main line (above) makes it possible to change laterals without shutting down the sprinkler system. Ernest Munter (left) is both purchasing agent and engineer on the big farm. He designed much of the special equipment.

was replaced with new tile recently.

This rather frightening circumstance is closely tied to drainage and you can readily see the reason when you consider the causes of subsidence. There are at least five such causes and increased drainage plays a major role in all of them. The most important reason is oxidation. These lands were once saturated by water through much of the year. Lower the water table, as you do with drainage, and air penetrates deeper into the soil than ever before. Oxygen then breaks down some of the organic matter in the soil and lets it escape into the air as carbon dioxide. The soils literally do a slow burn. Consider that these soils are so highly organic that there is a constant hazard from actual smoke-and-fire burning, and it is easy to see how either a slow or a fast burn worries the farm owner.

The high water table has always given buoyancy to thick soils and when you drain away the water you also take away the soil's support. Lowering the water table two feet increases pressure on the soil at the new water table by 125 pounds per square foot, which increases compaction. Added to these are shrinkage from drying soil, wind erosion and compaction by heavy machinery. "When you maintain the water level," says Munter, "and keep the soil wet or moist, you help slow down subsidence."

Wind erosion is a big problem on muck soils any place. Irrigation helps fight wind erosion on the Gehring farm but here they rely largely on their sprinkler systems which, incidentally, water much more of their crop land during the growing season than does subirrigation. "You can have the water table an inch below the surface," says Munter, "and some of these muck soils will blow. To really hold it you have to get the surface wet and sprinklers do this better."

12 Sprinkler Systems

Gehring first added sprinkler irrigation equipment to his list of farm tools in 1948. "We want our crops to get an inch to an inch and a half of water per week," says Munter, "and if they don't get it from upstairs we put it on with the irrigation systems." Potatoes and onions get an average of five irrigations a season. This soil takes water rapidly and won't puddle even though they put on an inch to an inch and a half of water an hour.

"We're set up to irrigate the corn," says Munter, "but there hasn't been a time yet when we thought it was dry enough to make irrigation pay. We can irrigate it when we want to and have even left roadways in our fields for the equipment. Corn irrigation is highly profitable on many farms," Munter adds, "but most of our corn is on lower fields that hold water well."

There is enough irrigation equipment on Gehring's farm to water 3,000 acres if the need arises. Although they have 12 complete irrigation systems, all equipment is standardized and interchangeable from one unit to the other. Each system includes a pump, which can deliver 1,000 gallons of water per minute, pipe for main and laterals, and eight large sprinkler heads which cover about three acres per setting. The droplets of water from big, high-pressure sprinklers won't damage root crops or cause much erosion on level lands. After each irrigation, laterals, mains and pumps are moved, the pump is set up again along the ditch supplying water and the laterals and nozzles are moved along the main until this area, too, is watered. The feeder ditch is kept full by pumps which lift water from deep wells.

The 8-inch steel mains are fitted every 180 feet with a cross which feeds water into 6-inch aluminum laterals going off the main on either side. "The reason for steel mains," says Munter, "is that they were all that was available in 1948 when we bought the systems." Valves in the cross enable the field crew to cut water off in any lateral so it can be moved and open the way for water into laterals once they're in position and sprinkler heads are in place.

Each lateral is composed of eight 20-foot sections of pipe with fittings for four sprinkler heads at 160-foot intervals. The irrigation crew is always moving one lateral while the other one is applying water. The crews have an hour and fifteen minutes in which to move a lateral. "Our pumps run continuously," says Munter, "and we irrigate 24 hours a day. The night crews learn to get along very well in the dark and don't even need flashlights most of the time."

These three-man crews know the Gehring Farms when it's quiet and peaceful. There is no machinery racing back and forth along the dusty lanes and there is none of the high-geared activity that characterizes every daylight hour of farming on Gehring land.

Sprinkler irrigation on the Gehring farm usually starts during April but there are years when they use it in March. This is usually to combat frost or to wet newly-planted onion ground to prevent winds from blowing the seed right out of the ground. "A lot of times," says Munter, "we've saved a complete replanting this way." The sprinkler systems may be used right on into October when they're occasionally put to work to fit ground for fall plowing or get

(*Continued on page* 116)

Gehring, like Ralph Hassler of Butler County, Ohio (right), cuts roads through his corn to make room for pipe moving. So far he has not had to irrigate corn on his damp soils. Hassler has increased his yields 40 bushels with irrigation.

BUNDLING, The Gentle Art

or

Matrimony Encouraged

Being an account of

how Daughters may be married with Propriety and Guests Decently Housed without the extra expenditure of wood or other fuel

IN THE INTERESTS of propriety they had to draw the line somewhere, so they drew it down the center of the bed. The swain lay on one side of the line, the damsel on the other. This was called bundling. Usually the line was imaginary, as in Holland, Ireland and Wales, where the custom originated, but in America the line was sometimes accentuated by a dividing board laid across the covers and securely anchored at head and foot.

The custom was born of necessity; the simple dwellings of medieval Europe had but one heated room—the living room with its fireplace. When a suitor for the hand of the farmer's daughter came a-courting the presence of the family understandably cooled his ardor. Instead of the sweet nothings he yearned to whisper, his conversation was limited to the weather, his family, and the crops. Since parents (and don't ask why this has always been true) desired above everything else to marry off their daughters, they encouraged everything that might stimulate a proposal.

So, they guided the lad and the lassie to the cold and cheerless bedroom, tucked them under the warm covers, fully clothed, of course, and hoped for the best.

Travelers and the chance guest in these homes, like the suitors, shared whatever beds were available. The Dutch apparently were the first to establish the custom as a convenient method of conducting a courtship. They called it *questing* and it was under this name that it came to America with the first Dutch settlers. The Welsh, Scotch and Irish settlers brought along their own version, and practiced it under conditions which duplicated those of Europe of an earlier day.

There have always been two varieties of bundling: bundling to accomodate the chance guest or the traveler, a matter of expediency or necessity; and bundling as an established part of the courtship ceremony. The two are not to be confused.

Those who believed in bundling as a part of courtship asserted that it was downright cruel to send a suitor abroad into the bitter, dark night of a New England winter. Usually he faced miles of cold walking. The kind thing was to invite him to stay out the night. Half a bed was better than no bed, so he was asked to share with the daughter, and to conform to all propriety, the two of them bundled, fully dressed. Some rare ones used a dividing board in the bed, securely anchored at each end and pressed down over the covers. Other safeguards were bundling sacks, and night dresses tied at neck and hem. Skeptics have said, however, that the knots were more often than not slip knots. One ingenious parent attached a string of sleigh bells to the bed post. The clothing was usually regarded as sufficient.

As bundling flowered and its possibilities were explored, it became a rather common custom for a maid to place a lighted candle in the window, just as the Amish used to paint the front gate blue when they had a daughter of marriageable age.

It was in America, then, that bundling came into full bloom. Better living conditions and public sentiment had sent it into decline in Europe, but the climate under which it existed in the Old Country was duplicated at a later date in the colonies. In its heyday, from 1750 to 1780, it was prevalent throughout New England, extending south to bordering states. It was strong in Pennsylvania, where the Dutch made much of it.

It became common enough to excite the reformers, and, as a social problem, it occupied about the same place in the public mind as integration and juvenile delinquency do today. Washington Irving, chief chronicler of Colonial America, says that bundling was chiefly responsible for the rapid increase in the population, and as such, was a darn good thing. He adds that but for bundling the incidence of spinsters and roaming bachelors would have been much greater in Colonial times and that love certainly would have died of exposure in the bitter New England winter. Many an unwary bachelor was trapped in a bundling bed.

Jonathan Edwards led the anti-bundlers. Edwards roared out a sermon against bundling and his example was followed on down the line by lesser lights in the clergy.

Strangely enough, Colonial wives and mothers were the chief defenders of bundling. They quoted both sacred and profane history to back up their contention that bundling was entirely proper and acceptable. The sleeping arrangements of Boaz and Naomi were cited as divine sanction for the practice. Poets endorsed the custom. Israel Perkins, a learned Connecticut clergyman, penned a long poetic defense in 1786. The gist of his thought is contained in the opening stanzas:

"Since in a bed a man and maid
May bundle and be chaste
It does no good to burn out wood
It is a needless waste.

"Man don't pretend to trust a friend
To choose him sheep and cows
Much less a wife which all his life
He doth expect to house."

While Perkins, one lone clergyman, versified in defense of bundling, the men of Puritan cloth were quite unanimous in

(*Continued on page* 85)

NO SURPLUS IN SUGAR BEETS

Cooperation between farmer, industry, and government regulates the price of sugar, and prevents overplanting of the crop

THE FARMER, the factory, and the contract are the triumvirate of the sugar beet industry. Together they control a complex industry which supplies almost one-fourth of the nation's sugar—without over-production.

The contracts are similar wherever the beet is grown—in California, Colorado, Idaho, Michigan, Montana, and in the other 17 producing states. The factories are basically the same. But, needless to say, no two growers are alike; and the way these diverse individuals have been pulled together makes the smooth running of the complex sugar beet industry an outstanding example in farming: victor over the surplus, the dirtiest word in agriculture.

The beginning is in the field, where you meet the men who are growing the crop. In the Saginaw Bay area of Michigan in a village called Kawkawlin, is a beet grower by the name of Leonard Schwab. He cannot be called a typical beet grower, because there is no such man, but he is a long-time producer of the crop.

This past year he raised 70 acres of beets. He hopes for more in the coming year. Last spring as he directed a tile-laying job in one field of a new 140-acre piece of flat, heavy land he had just added to his farm, he reflected briefly on his work. "I've been

The giant loading arm, slowly sweeping across the sky, piles a grey-white mountain of sugar beets. This "rock candy" range is air conditioned until the beets are fed into the factory.

working on sugar beets for forty-five years," he said in his faint German accent, "thirty-one of them on the same farm."

But he snapped back to concern for the present. "Seventy acres is a big allotment and I'd like to start them off right."

The allotment is part of the contract—no one grows all the sugar beets he likes. In Michigan the allotment belongs to the farm rather than the farmer and Schwab hopes to apply for an increase in 1959 to put some of the new land into beets. The local Agricultural Stabilization and Conservation Committee will handle his application. As an old grower he has a better than average chance for an increase.

Does he often ask for an increase to the allotment? "No," said Schwab. "Beans are my other cash crop. If I, and others like me, grow beets instead of beans, the price of beans at the Saginaw elevator skyrockets, and we miss the killing. If we grow too few beets and all beans, the bean price falls. So, we have to keep a balance between the two crops." In this way Schwab and other beet growers bargain with the sugar companies on the contracts they sign. There is always an alternative crop, and farmer and sugar beet factory must compromise on the contract.

The Sugar Act

The consumption and production of sugar rise annually with the population. For years there was no control of supplies, and glut and scarcity of sugar played havoc with the price. If the housewife was irritated, the industrial user was frantic. In the twenties the price of sugar varied from 3 cents to 27 cents a pound. All was chaos.

Only in 1934 came a successful law to hold supply in balance with demand. This was the Sugar Act; originated as part of the New Deal; declared unconstitutional by the Supreme Court; amended and passed into United States law in 1937. It replaced a succession of tariffs and agreements reaching back to 1789. The new act had three apparently contradictory purposes: to supply sugar at reasonable prices; to encourage foreign trade; and to protect a competitive domestic sugar industry.

The basis of the Sugar Act was, and is, an annual estimate by the Secretary of Agriculture of the sugar needs of the United States for the coming year. The Act provides for the division of this estimate between foreign and domestic producers. About half the sugar used is imported cane sugar. Domestic producers supply the rest from beet fields and cane plantations. Of the nine million tons of sugar Americans are expected to consume this year, more than two million will come from sugar beets.

Slow Start in America

Establishing the beet industry was not easy. The first group to try, The Beet Sugar Society of Philadelphia, bloomed and faded in the 1830's. Across the nation, between 1838 and 1879, fourteen factories began and failed. Even the diligent Mormons of Utah, with the newest equipment sea-shipped and ox-hauled from successful factories in France, found sugar-making an elusive art.

At last a factory succeeded at Alvarado, California. in 1879. Remodeled, it stands and produces sugar today. By 1900 thirty factories were operating in America. Competition from foreign producers was fierce, and the tariff on imported sugar varied as the world situation changed. Agreements with Hawaii and Cuba affected their production and the price of sugar, but the new law curbed the unruly adolescence of the sugar market. The stability of the domestic industry resulted from the Act.

The Secretary's estimate of U. S. sugar needs is calculated from past figures, forecasts of consumer trends and the carry-over of last year's crops. The consumption of sugar in the U. S. is around 100 pounds per person per year. This has remained constant for several years, although recently far more of it is consumed in manufactured or prepared foods than directly by the housewife. The share of the domestic producers is controlled by the Act which also controls the proportion to come from beets. This quota is then allotted among the sugar companies—each is told how much it may sell, and may be fined for selling more.

Next, the Secretary, through the Agricultural Stabilization Committees, makes beet acreage allotments to farmers in the 22 producing states. These are calculated so they will supply the tonnage of sugar required. The acreage allotments begin with a national figure. For 1958 this was 935,000 acres. This is broken down to a state figure and then to the individual producer. The state ASC committees are responsible for the allotment program. The Secretary of Agriculture insists one per cent of the allotment be held for new growers, but in determining a farmer's share, his history of beet production is important. This history is almost the assurance of renewal of an allotment. Like other crops the allotments are determined before the crop is sown.

Applications and appeals are made to the ASC in the area. Once the farmer has his allotment, he signs a contract with a factory to buy his beets. The farmer is strictly a free agent. He can (and does) choose any factory he wants. Distance, however, limits his choice, for he must transport the beets to the factory or nearest receiving station.

Once signed, the contract binds the farmer and the factory. This single sheet controls the production of sugar. No contract means no seed, no crop, no payment. This agreement outlines the obligation of both producer and processor. The farmer will buy the seed at cost from the company. He will grow the crop, harvest it and deliver it to the factory. The factory produces sugar from the grey-white roots.

When the sugar has been made, the parties to the contract have a joint interest in the sale of sugar. The costs of selling, advertising, storage, taxes, insurance, and any others are deducted from the selling price. What is left is divided between farmer and factory on a fixed scale; roughly 50-50, although this varies across the nation. For example, if sugar were sold to a broker at 8 cents a pound, and merchandising costs were 1½ cents, the farmer and the company would divide 6½ cents.

For the 1956 crop, a Michigan farmer would receive 52 cents out of every retail sugar dollar. In California this figure would be slightly higher.

A complication is the tax. There is a tax of 53½ cents per 100 lbs. on all refined sugar eaten by humans in the United States. All sugar pays this tax, no matter if it came from cane or beet, at home or overseas. The money goes to the Treasury. From the Treasury, all domestic producers receive a payment—the

The deep-rooted sugar plant is grown in 22 states. Clair Davis, a Staten Island, California, beet farmer, carries about three and a half pounds of sugar in the pair of ten-pound sugar beet roots.

The short-handled hoe is less drastic than the whirling thinner, (below) and does a much neater job. But the big grower may be driven to mechanical thinning; even as he has found mechanization necessary in harvesting and planting.

The beet tops, cut (above) before the roots are harvested, make excellent silage, especially when mixed with corn. The roots are topped and lifted (below) mechanically. This is a two-row harvester.

Federal Conditional Payment. "Conditional," because to be paid, the producer must play the game according to the rules. He must pay at least the minimum wage, must stay within the acreage allotment, and not employ child labor. If he complies, he qualifies for a payment that last year amounted to $2.32 per ton of sugar beets produced. This payment, calculated from a five-year average of actual sugar recovery, varies little from year to year. For an average farmer in 1957, 20 acres would bring $593. This, argue the producers, is not a subsidy, because the farmer pays part of the tax and then gets some back. But, in fact, the domestic industry receives more than it pays, and so is supported in part by the tax levied on imported sugar. This is one price support program where the Treasury comes out ahead, receiving more from the sugar tax than is paid in Conditional Payments.

The farmer receives his share of the sugar money over almost a year. From 75 to 90 per cent of his total comes soon after he delivers his roots to the factory, but several other payments are made in the following months. The Federal Conditional Payment is received in January or February. The final payment from the factory comes about the time the next harvest begins, when all the sugar from the previous crop has been sold. The delay is necessary because the price of the sugar, and therefore of the farmer's share, varies through the year.

A Changing Crop

This uniquely organized industry, based on a law that has made a surplus of sugar unknown, is changing annually. Beets are grown in 22 states. The big two are California and Colorado, followed by Idaho, Nebraska, Michigan, Montana and Washington. The crop thrives at low and high altitudes and in a variety of soils—from sub-irrigated peat soils in parts of California to heavy clays in Ohio. Every acre is part of an allotment. They are grown in five-acre lots by dairy farmers who want the dried pulp, and in five hundred acre fields by farmers who want the money. Somewhere in California a sugar beet factory is in operation nearly every day of the year. In other states the sugar-making campaign is finished 80 to 120 days after harvest. When the sugar-making season is over, the whole plant is shut for repair and maintenance. The apparatus of sugar production is cleaned, modified, improved, replaced if necessary, and reassembled. The season brings non-stop work, 24 hours a day, seven days a week, and a halt costs money and high blood pressure in the front office.

As the factory modernizes and mechanizes, so does the farmer. The crop is sown in the spring and within six weeks is at the four to six leaf stage. Then it is thinned until the beet population is about right for the area—which may be between 25,000 and 40,000 plants per acre, depending on the climate and soil. Too many and too small plants, as well as too large and too few, affect tonnage and sugar content. The crop is mechanically cultivated to reduce weeds, and perhaps sprayed.

The harvest, usually after the first frost, involves raising and topping the beets. The top, or crown, of the beet is removed and the root shaken free of soil for its trip to the factory. This used to mean hard work, but gradually all the peak labor requirements of the crop are being reduced by mechanization.

The change to mechanical harvesting took place rapidly soon after the second World War, and the crop's labor peak is now the spring hoeing and thinning. In many areas the factories arrange for migrant labor from Mexico and south Texas to spend six weeks hand-hoeing the crop. But most parts of the country are now moving to machine thinning. Michigan is one of these. The resistance to machine thinning often comes from the farmer who is shocked at the attack the thinner blades make on the young plants. "It looks as if the crop is being cut to hell, and you know it'll never grow again," said one farmer.

But this attitude is slowly changing. Wilmer Schwab, Leonard's son, tabbed the trend when he said, "Thinners are going to be like harvesters. The harvester didn't work until there wasn't any labor; then the same machine did 100 acres a year—and a real good job."

"Lack of labor at peak periods will speed the change," thinks Grant E. Nichol, agronomist for the Monitor Sugar Company in Michigan. "The thinning season usually lasts six weeks," he said, "but in a good year everyone plants together; they all need to thin

together; and the work should be over in a week. You can't get migrant labor to come all the way up here for a few days work. Farmers are going to be driven to mechanical thinning." Nichol, who spends "far more time than I should" looking at the new beet crop every spring, feels "when machine thinning comes, it'll come in a hurry."

In the West the picture changes. Producing the Michigan beet crop is as different from its California counterpart as a chassis in Detroit from one in Hollywood. A man who knows the sugar industry in Northern California is Louis Kloor, district agriculturalist for the Holly Sugar Corporation. He has been working with sugar—beet and cane—for 36 years. "Machine thinning," he says, "hasn't taken on in Northern California as fast as in many other states or even some other parts of this state. One reason is that hand labor is required for other crops here, and so usually there are plenty of field workers available. Another thing is the problem of getting a stand—even with irrigation used on virtually every field that rate of emergence isn't always so good here. But improved precision planters, good irrigation and better seed are paving the way for more complete spring mechanization, no matter what the labor supply."

However, migrant and itinerant laborers still work the short-handled hoes each spring. "I frankly believe," said Kloor, "there will always be a place for the hoe in a sugar beet field."

Railroad, Truck and Scow

Growers the country over carry the beet to the factory or the factory receiving area. By truck and trailer, iron rail, or river barge, the beets are delivered to the processors. There they are dumped into the noisy, clanking mouths of huge distributing machines that pile them by the thousands of tons until the factory can inhale them. The giant piles are air-cooled by fans to stop heating.

The beets that travel by barge come certainly the cheapest and perhaps the most romantic routes. This barge traffic is common in the river mouths of California, and in Wisconsin along the lake front. One of the California barge men is Al Cromwell, a single man and a talkative one. He has been a captain on a barge since 1913, when he lied about his age and ran away from school to work a tug boat. Cromwell recalled the days when the beet crop was handled all by hand and the barge was not a common transporter of beets. His association with the beets came when he overheard a hauling contract refused by one of the tug and barge companies. He suggested another owner to the rejected party, and then went to work for this firm himself. "The contract was to move 90,000 tons of beets and we did it in 30 days and 30 nights without stopping. That was in 1934, and that was a lot of beets," said Cromwell. "It's a lot cheaper to ship 'em by barge," he said, "and two barges like I pull carry 900 tons each. Now, if you were to move them by rail, you can figure it would take 45 or 50 cars, and you would need twice that many trucks. Some of the big barges can carry 1500 tons apiece, and the company used to ship them overnight from Grand Island on the Sacramento River down to the Ninth Avenue dock in Oakland, about 52 miles, in 7 or 8 hours during clear weather."

Cromwell recalled a friend of his, tug captain Two-Stack Alexander, who was bound for home and marriage one evening in the early days, when a fog settled on the river as black as arctic night. But a man with matrimony ahead is not easily deterred, and Two-Stack was a determined man. He had his deckhand throw beets, one by one, ahead of the tug. So long as he heard a splash, he crept ahead. There was a wedding—a by-product of the sugar crop.

But the beet has by-products other than its splash. By-products which some contend provide as much livestock feed per acre as an average crop of grain or hay.

(*Continued on page* 117)

One of these barges on the Sacramento River in California can carry 1,500 tons of beets, the equivalent of several dozen trucks or railroad cars. This makes barge transport cheaper than any competitor, even when a quiet, opaque fog creeping across the water, slows river traffic to mud-crawler pace.

By Don Muhm

ROLLING HILLS AND RUGGED CATTLE

The grass which covers the 20,000 square miles of the Sandhills is better than it was in pioneer days; and the cattle which graze that grass are always in demand

SUNRISE CAME UP over the hills like a cat. It stretched, then spread its claws of dazzling brightness in all directions, over the unbroken vastness of the Nebraska Sandhills. It was May, and Wally Farrar's "F Quarter Circle" cowhands were throwing the heifers together on the Spring Valley Ranch, south of Hyannis, for the drive to the Dismal River spread over to the east. In all that 40-mile trek they would cross not one road. For even today the Sandhills are a far-flung and sparsely populated cattle land spreading over 21 counties, 20,000 square miles of western Nebraska, between the North Platte River and the South Dakota line.

Here is a spot where the grass is richer and greener than it was when the first white settlers moved in; where the chuck wagon is still a tool; where the remuda is yet to be replaced with a battery of jeeps; and where cattle thrive in what might almost be called the perfect environment.

Farrar, a veteran of a quarter century of Sandhills ranching, is an ex-Iowan who went west to make his mark. And he made it big. In fact, that mark now spreads over roughly 75,000 acres divided about equally between the two places mentioned. This is one of the larger Sandhills outfits. Ten thousand acres are generally regarded as sufficient to make a well-balanced unit.

Every spring Farrar takes his cattle down to the Dismal River Ranch from his Spring Valley spread. Since the heifers and steers and the cow herd are handled separately, it means four to six drives a year, each drive requiring three days on the trail.

"Why don't we truck them? Because it's easier to drive them," Farrar explains. "Easier on the cattle and easier on us."

The morning in question the heifers were just leaving the Spring Valley place. After a man-sized breakfast of eggs and bacon, biscuits and coffee, the cowhands headed the cattle for the gate. Skillfully they skirted the herd, heading any potential deserters which might try to strike out on a tangent of their own. Then, at a signal from foreman Cecil Goslin, they prodded the bunch into action.

With a buck, a jump, a skittish trot, or a high-tailed dash one Hereford after another peeled off from the mass and zoomed through the opening while Goslin tallied them—almost 1000 head—with the precision of an adding machine.

The irregular ribbon of red and white flowed through the hills like a stream of water seeking the course of least resistance. In the lead was the chuck wagon and the remuda—the saddle horse band. The point riders led the herd, with the swing keeping them from spreading out too far and the drag moving the stragglers along.

At times the cattle would jam up; then, again, they would sprawl out in a string reaching forward as far as the eye could see and back across the horizon to the rear. Mile after mile they scuffled along like war-weary infantrymen moving forward to combat, cautiously, as if the enemy might be just beyond the next hill.

Whenever a windmill came into view they would quicken stride and spurt forward toward that symbol of the Sandhills oasis.

Up ahead an advance guard cleared "foreign" cattle from the path. For, actually, this is no established trail the Farrar cattle follow. They cross these intervening ranches only through the courtesy of the respective owners and the greatest care must be taken that there is no mixing of cattle.

Across "Rattler Flat" where they always kill at least one rattlesnake, the cowboys

moved the tiring herd. Then, as the sun slipped behind the hills like a brilliant red balloon in a cloudless sky, they prepared to camp for the night. Almost 18 miles of trail were behind them. At noon they had changed horses.

A game of horseshoes filled in the time while cookie Ed Potthoff readied supper. After the meal a game of pitch got underway by lantern light. But it broke up early. Long before the sun would show itself again all hands would be in the saddle and on the trail for another 18-hour day.

Soon the only sounds to be heard around the camp were the near human wail of a coyote, the occasional snort of a horse, or the lowing of a heifer from atop the hills.

This is one aspect of modern ranching in the Sandhills. It is in the tradition of the old west, yet new techniques, particularly in selling good cattle, have been adopted enthusiastically to make this region one of America's top producers of beef.

Big is a poor word to describe the Sandhills. It is vast, treeless, without landmarks. Before the days of the white men, the Indians feared the region. To enter upon its unmarked hills was a real test of courage. Hunters would start fires to try to drive the buffalo out, but would seldom go in to get them. Much of it today is still just as fearsome to the stranger. One traveler who wandered off the road in the fall of 1957 was lost for three days and nights.

There are two theories about the geologic origin of the Hills. One is that native bedrock was reduced to sand by untold centuries of weathering. The other is that early streams carried deposits of sand into the area, which deposits were left exposed to the wind action when the streams dried up. The wind gathered up the sand, rolled it into dunes which marched, wind-by-wind, across the prairie. Pioneers are said to have been able to work out their directions from the fact that the hills had been piled up by the prevailing northwesterly winds.

Careful adjustment of livestock to land —a cow to about 20 acres seems to be the safe stocking rate—plus the willingness to follow the grazing rule of "take half and leave half," and the prevention of grass fires has made this country even richer and more productive than it was in its virgin state. When the area was first settled, the peaks of the hills were barren. Now they are carpeted with grass.

Blow-outs

"Blow-outs" are the scourge of the Sandhills. When the land is over-grazed to the point where the grass cover is reduced to a dangerous level these spots appear as great white, sandy wounds on the landscape. It takes four to five years of rest to bring such a spot back into production. But the ranchers have learned to control blow-outs in the hills as surely as in the tires on their cars.

Wilbert Ericksen's techniques give a good picture of range management in the Sandhills. "Keep the cattle scattered," is the key to his operations. To help do this he has built over seven miles of fences in the last three years on his ranch of about 9600 acres northwest of Seneca.

His fences follow the ridgelines because "the cattle graze a lot better that way," he has observed. The ranch is broken up into pastures each containing about a section. He believes that no more than 100 yearlings at a time should ever be grazed on one of these sections. "If you have good grass," he advises, "just pasture it longer."

Each of the pastures has a well for its water supply. And, as another device to help scatter the cattle, Ericksen salts them in various spots around the range a good distance from the wells. He also distributes his back-scratchers in remote spots so the pasture will be grazed evenly.

Ericksen rests each of his pastures every fifth year, to give the good grasses, the decreasers, as rangemen call them, a chance to come back. And he never mows on the hills. "You can do just as much harm by mowing, as you can by plowing," he says. All his hay comes off the lower meadows.

Like most of the Sandhills holdings, the Ericksen ranch is deeded land. Only a very small percentage of the land in the region is leased from the state or federal government. The turn-over in ownership is small so it is difficult to test the strength of the land market which, of course, varies from one part of the Hills to the next. A good average price per acre at the present would probably be around $35.

Of the grasses, which are the glory of the Sandhills, there are more than 65 different kinds—the gramas, buffalograss, bluestem, wheatgrass, sand lovegrass, reedgrass, switchgrass, sanddropseed and dozens of others.

But grass does not grow without water. And this is where the Sandhills really have it good. Rainfall in that area is only 15 to 25 inches in "normal" years. It frequently drops below this level. But the region has never know a real drouth.

The water table is high, in most places within 20 feet of the surface; so high in some locations, homes must be built without basements. And the land is studded with small lakes. In dry years as the water recedes the grass grows farther down on the lake beds or "wet meadows" and on the uplands some plants are able to send their roots down to the sub-irrigated areas of the soil for moisture. The result is good grazing and a good supply of hay. During the wet cycle the grass grows thicker on the hills.

Protection from drouth is a factor which has also been a real help for the ranchers in maintaining quality in their herds. Never do they have to sacrifice good cows and heifers because of withered pastures.

There are two types of range programs in the Sandhills based upon whether a man is a haymaker or a winter grazer. The winter

(*Continued on page* 104)

The faces of the Sandhills people range from the canny, speculative face of Jerry Francois (below), breeder and trader of draft horses, to the worldly look of Dr. Mike Chaloupka (far right) who is physician to the ranchers and a raiser of Beefmaster cattle. The ranch hand at a Sunday rodeo and retired homesteaders are typically independent types.

Horsepower is horse power in the winter. Equipped with front and rear drive, this hitch has plenty of traction for cabling a haystack onto a "sled" and delivering it to the cattle on the Flying A Ranch. Boots, saddle, chaps, and lariat are the tools of the ranching trade.

Automation and specialization go hand-in-hand. On this semi-automated farm one man does all of the work to raise and finish 750 head of hogs. With an auger feeding system, he could raise this figure to 1,000 a year.

TOWARD PUSH-BUTTON STOCK RAISING

By Wayne Ritchie, *Managing Editor, Doane Agricultural Digest*

IN 1910, farmers worked a lot harder than we do, but we get more done. In one day in the corn fields we can do what they thought of as a week's work—we do a lot better than that in such crops as beans and cotton. All this because we work from the seat of an efficient machine from plowing to harvest.

Raising livestock is a different story. Here we are about as automated as a wheelbarrow pusher or a hod carrier. True, we do a little more work than grandpa did, but not enough to brag about. This need not be so. Today, we have the machines, the buildings which work for us, the feeders and other equipment to move toward automation in livestock raising.

Why don't we do it? Mainly a lack of engineering know-how. It takes skill to put conveyors, augers, mixers, buildings, slabs, bunks, silos, bins, sheds, shades, meters, and scrapers together in a combination which will do the job and not bankrupt us. There is no automatic hog or steer or lamb raiser —just dozens of machines and buildings and new devices which will help us.

There are some very general rules for guiding us in assembling this equipment into a labor-saving operation. Professor N. H. Curry, an agricultural engineer at Iowa State College, gives five: (1) Analyze what you are attempting to do. How large are your livestock operations? How large will they become? What quantity of feed is required? How much manure must be moved? (2) Begin to make comparisons between alternative methods of solving your problems. (3) Determine the rate of return on the investment in new equipment. (4) Count on dealers to help you with the installation. They are getting better all the time. (5) Expect a slightly ragged performance at the beginning. It takes anywhere from six months to a year to get the bugs out of a system.

"When I suggest analyzing what you are attempting to do," Professor Curry said, "I mean it is important to work out a solution to the general problems of handling all the materials involved, rather than to attempt to solve each of the problems separately. Working at one problem at a time too often results in what we call scatter mechanization rather than pattern or systematic mechanization."

A good example of the scatter mechanization Professor Curry warns against is the use of a bulk tank, a stanchion barn, and individual milking units. Very little time or walking would be saved by this system. The cow would be milked mechanically, the milk would be handled mechanically, but it would take manpower to move the milk from the cow to the tank. The installation of a pipeline would change this set-up into pattern mechanization.

Today, most farmers are expected to make the objective study, do the analyzing and make the estimates Professor Curry suggests by themselves, for there is very little professional assistance available to them. A recent edition of the Agricultural Engineers Directory showed only nine members of the profession whose major activity is in this field. There are others, of course, who are trained in farmstead engineering working with the land grant colleges, the utility companies and commercial firms manufacturing farmstead equipment, but the farmer's choice is limited.

One specialist in farmstead engineering is Bill Fletcher of St. Louis. He is with a firm that began this special service in 1950 and has been at it ever since. "The importance of getting an over-all plan of the operation is basic," Fletcher said. "In looking back at the loose-housing dairy systems we've seen installed, invariably we find the size of the operation was increased much more rapidly than the owner originally thought possible. My own feeling is that the operators didn't have any idea how many more cows they could handle with the new system. The advice of an experienced professional would certainly have helped them."

Automate or Simplify

"With the over-all farm plan in mind," Fletcher said, "the first basic decision is whether to automate or to simplify. These are two different roads which can lead to labor saving. They both have their uses and their drawbacks. Some farms can use

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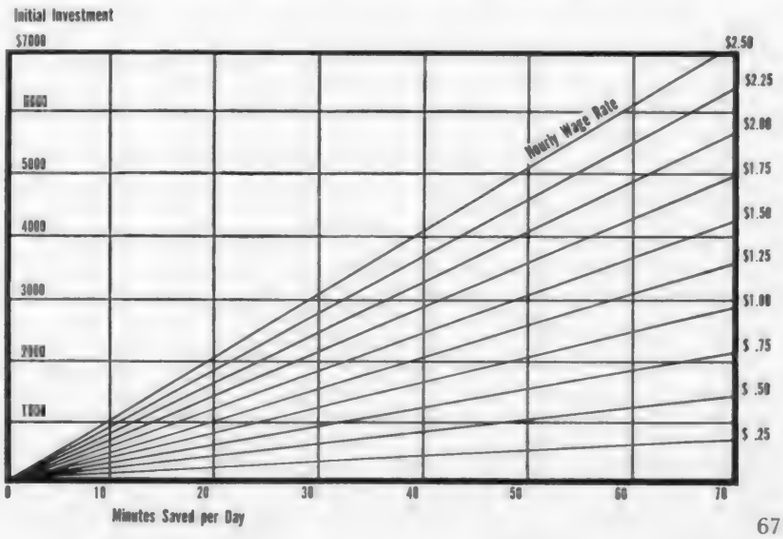
The value of labor-saving equipment depends on wages and time saved. The amount which can be economically invested is shown on the left of the chart where the wage rate line crosses the line showing minutes saved per day.



TOWARD PUSH-BUTTON STOCK RAISING

We have the equipment to cut livestock-handling labor to a half or a third of our present national average. The difficulty is arranging it to fit the farmstead, and engineering help to do this job is hard to find. Two roads are open to the farmer, to simplify the operation when handling roughages or to automate. In either case, the farmer usually moves toward specialization.

THE NEW TRANSMISSIONS

A farmer has to know the workings of the mysterious new gearboxes to buy the one to fit his needs and to use it efficiently

PROBLEMS WITH transmissions really began when we left the steam engine. This old monster with a bellyful of steam gave smooth, even thrust to the piston with a little more power at low engine speed. The power unit was coupled through simple gears to the rear wheels. When the driver opened the steam valve, the flywheel rang, the governor whirled, and the gears flicked oil scornfully at bystanders as the behemoth glided forward with boat-like grace. For greater speed, more steam was used. To stop the wheels, you stopped the engine.

As drivers turned to the more convenient, if less thrilling, internal combustion engine, the transmission of power from engine to wheels became more complex. The tractor grew into a long and powerful unit. Some of this growth came from lengthier and more complex transmissions.

The power for the internal combustion engine was a controlled explosion in the cylinder, the old smooth steam pressure was gone. The new engine created a new set of problems. It stalled below certain speeds and, of course, had a top speed, too. The first job confronting designers was to connect a moving engine with stationary wheels—and the solution was the clutch. The hardworked clutch had to link the parts slowly, until they both moved together. It serves the same purpose today.

Another problem was the limited range of speed of the internal combustion engine. A transmission has to supply the wheels with a wide range of speeds from a more nearly constant engine speed. First this was done with the gearbox. With two, then three and four gears, flexibility of travel speed was obtained. And a reverse gear was a necessity; the steam engine would run backwards—the gasoline engine would not.

This gearbox was a simple affair. Drive a big gearcog with a small one and you have low road speed; drive a little with a big one and you zip along. But the gear is only a form of lever; the "low" gear gave the engine more leverage over the wheels, providing more torque to move loads or climb hills. An axle driven at a high speed had low turning power or torque; the same axle, driven by the same engine, geared down to a lower speed, had greater torque. Torque or turning power, carried by a wheel or shaft is gained by the sacrifice in speed.

With World War II the tractor faced many new jobs at widely different speeds and loads. The result was a range of tractor sizes to give a range of power; and adaptation of the transmissions to handle that power at different speeds.

An engineer will take the story from here: he is L. W. Randt, of The Oliver Corporation. Randt is a big, fair-haired man, with a laugh that bubbles out when he stops to reflect on a point well made.

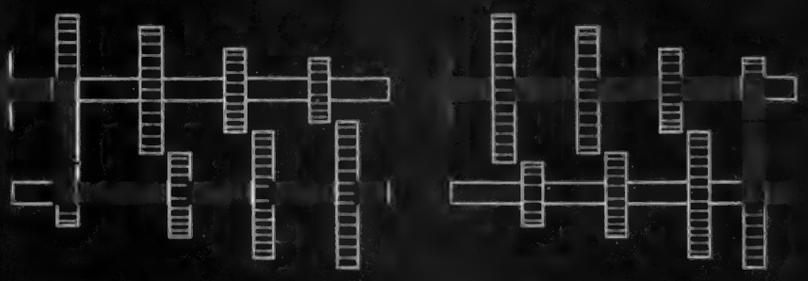
"Tractor transmissions," said Randt, "have only in recent years begun to approach the operating characteristics of modern transmissions in trucks and automobiles." He explained, "In a tractor you select an operating gear, mainly by experience, and then use a clutch to lurch the load into motion to reach operating speed.

"But let's begin at the beginning," he said, leaning back in his chair. "The history of the tractor is that we started to tailor the torque performance of the engine to try to meet a broad range of loads." He drew a picture on the corner of a notebook, similar to the diagram above the title of this article. "A tractor engine is usually designed so its torque increases as it slows down under load with the throttle open. When a tractor engine is pulled down from governed speed under full load, we call it lugging the engine. It is a tractor's lugging capacity which enables it to pull a load up a hill or through a rough spot in a field without changing gear.

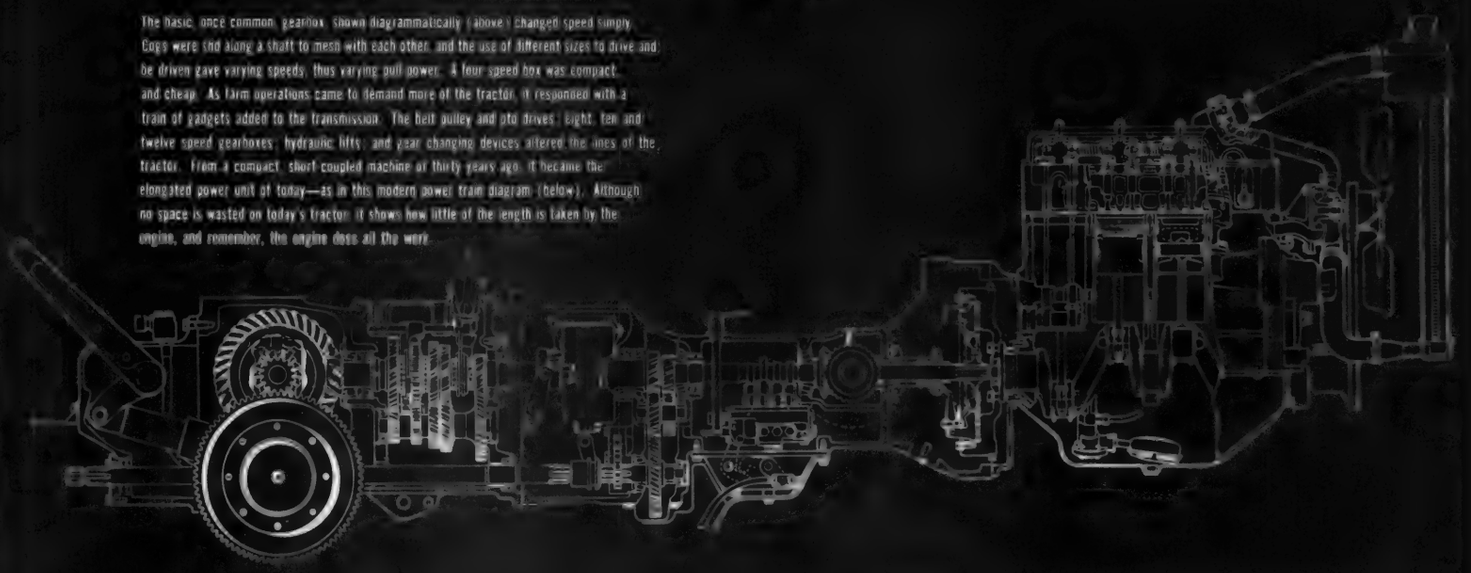
"But," he warned, "there is a limit to the allowable increase in torque as an engine loses speed, no matter how wide you open the throttle. Beyond a certain point, the engine stalls unless you change gear. Any car driver who accidentally started his car in top gear is familiar with this

THE NEW TRANSMISSIONS

The modern farmer has an ever-widening choice of transmissions to pick for his new tractor. Perhaps he will choose a multi-speed gearbox, or an attachment to give gear changes under power. A draft control device can help traction, and reduce the pull of an implement when its load is overcoming the tractor's engine. A torque converter gives another kind of convenience, when it matches drawbar pull exactly to the load on the drawbar. In 1959 even newer and more automatic designs will appear, to widen the choice. The devices make the tractor more expensive, more complicated, and easier to operate. Your selection depends much on the job to be done.



The basic, once common, gearbox, shown diagrammatically (above) changed speed simply. Cogs were slid along a shaft to mesh with each other, and the use of different sizes to drive and be driven gave varying speeds, thus varying pull power. A four speed box was compact, and cheap. As farm operations came to demand more of the tractor, it responded with a train of gadgets added to the transmission. The belt pulley and pto drives; eight, ten and twelve speed gearboxes; hydraulic lifts; and gear changing devices altered the lines of the tractor. From a compact, short coupled machine of thirty years ago, it became the elongated power unit of today—as in this modern power train diagram (below). Although no space is wasted on today's tractor, it shows how little of the length is taken by the engine, and remember, the engine does all the work.



sequence of lugging and overloading."

Randt got back to the saga of the gear stick. "Changing gears with the heavy loads a tractor pulls never has been much fun," he said, "and the manufacturers have introduced many improvements to make shifting as infrequent as possible. This has led to the invention of compensating devices to reduce the need for changing gears.

"We started out with three and four-speed transmissions, then five and six-speed, now there are twelve-speed boxes. Along with transmission improvements, the industry introduced draft control of implements. Draft control raises the implement out of the ground, at the same time increasing traction and reducing the draft load on the tractor until it passes the rough spot. These devices, in a sense," said Randt, "increase the efficiency of a tractor by helping it through the rough spots. The hydraulic draft controls are mechanical muscles for the tractor operator, a tremendous improvement, but are you improving field work quality of an implement when you raise it from the depth you first chose?" Randt shook his head. "We only change tillage tool depth in order to get improved traction to enable us to work the field under a wider range of load conditions.

"Take a 1940 tractor, or even a '54 model for that matter. Start plowing a field." Randt tipped his chair forward and emphasized his point with a finger. "If you hit a heavy spot beyond the capability of the gear you selected, you are going to lug the engine. Because of the possibility of excessive engine lugging most farmers don't run a tractor above 75 to 85 per cent of its capacity—they have to have a safe margin of reserve power—besides operating an engine at an approved load level adds many hours to its life.

"Engine lugging," said Randt, "has been a determining factor in tractor performance. Tractors will lose from 20 to 29 per cent of their horsepower output when the engine slows down from optimum governed speed to peak torque and lugging range. Every time a tractor engine loses revolutions, a portion of the horsepower output of that tractor is lost. Another effect of excessive lugging is abnormal engine wear, and for this reason manufacturers recommend a safe operating range for each tractor. When you eliminate lugging this not only gives the engine longer life, but you have made the first net gain in horsepower-hours output and work done.

"The industry in recent years introduced a major improvement to the tractor transmission. This was the auxiliary underdrive transmission which allows power down shifting from the selected operating gear without stopping the tractor. It gives us the means to get through rough going without stopping and then shift back up to operating gear. Some engine lugging still takes place and the entire problem of lugging is not eliminated. Then, too, the industry was looking for a mechanism that would enable us to do considerably more work with a tractor. We wanted to expand and broaden the tractor's work capability.

"It is this history," said Roy Randt. "which led us to introduce the torque converter in the large Oliver 995 tractor transmission. With a torque converter an engine may run almost continuously at optimum governed speed. Installing a torque converter in the drive line has eliminated engine lugging due to excessive drawbar loads. Future engines will be designed to be more efficient because torque converters will allow them to operate over a narrower speed range. Looking forward, it may also mean we will need fewer sizes of tractors. Perhaps one for every 15 to 20 horsepower instead of a different model for every 10 to 12 horsepower. And, since every tractor needs a group of implements tailored to its work capabilities, the possibilities for savings are tremendous, for both the manufacturer and the farmer."

The advances that Roy Randt has mentioned—multiple speed gearboxes, draft controlled hitches, the levers for changing gear on the go, and the latest of all, the torque converter—have all been developed over the years to meet the problem of transmitting power from engine to wheel. Each has its own peculiar virtues of convenience, cost, or operation, but each suffers its own drawbacks. When a tractor company introduces one of these devices, it retains the old line. Not everyone has a use for the newest transmission.

You don't need to read blueprints or power graphs to pick the best equipment for your farm, but a little mechanical understanding of the various machines is useful. It can almost certainly save you face, and may save you money.

The simple gearbox without frills is familiar to most of us. It has advantages as well as limitations. It is simple, and so is inexpensive. It is cheap to run and

The torque converter has three parts, the impeller, turbine, and the stator, with nothing between them to transmit the power except oil. The impeller is driven by the engine, and throws the oil against the blades of the turbine. The turbine is connected to the gearbox and from there to the wheels. The oil is returned to the center of the impeller by the stator, which is a set of stationary vanes attached to the converter housing. Thus the oil makes a complete circle at great speed to transmit the power. The diagram (below) represents what happens inside the compact converter, showing the circular oil flow. The design of the blades is extremely important to make the flow of oil do the most possible work, and waste as little energy as possible. Ideally the oil moves in an even, smooth flow.

repair. Less engine power is wasted in moving the gears it contains. The old unadorned gearbox is quite ample for many farm jobs, particularly when the load does not change frequently, or where the tractor has a reserve of power and good lugging ability. And, even if a farmer has to stop and change gear occasionally, he offsets this inconvenience with cheaper first cost and operation.

The refinement of six, eight, ten, or twelve speeds is an extra, but much work merits it. For rowcrop work, plowing, and many harvesting operations, the extra speeds save time and money in operation. Many farmers need pursue the transmission story no further than this.

The drawback to this type of gearbox is the small range of power in any one gear. A farmer with a hilly field, or with frequent heavy or wet patches finds he's changing gears more often than he likes or pulling up the plowshares manually to ease the tractor over a tough spot. A bigger tractor is one answer, but it costs more to buy and run. What could be done with the same engine?

Designers had two choices—to reduce the load or change gear. They made both easier. Some devices allowed the driver to change gear without stopping and with as little effort as possible; others used power draft control to raise the implement when the tractor could no longer pull it at the set depth.

Gear changing on the move. Simple, you might think, all cars do it. But the car does not pull the same load that hampers a tractor.

The driver needed to be able to shift under full power. One simple means of doing this is with a sun and planet gear system. This is so-called because one set of gears, usually three, runs around a center, or sun gear, like the earth around the sun. These three gears are called the planets. The sun, and the planet cogs spaced evenly around it, all lie inside another gear. This outer gear has teeth on the inside, and is called the anulus or ring-gear. It makes a circle around the whole system, and is in mesh with the planets. Thus the planets are trapped between the sun and the anulus and are in mesh with both. They look like a ball bearing race, where the planet gears are the balls. Outside the anulus is a clutch, which can hold it firmly, and prevent it from turning.

The drive goes into the sun gear, and comes out through the planets. The axle of each planet extends backwards, and then all three join into one shaft in a tripod arrangement or planet carrier. The power leaves through this planet carrier. The anulus does not transmit power, and is not connected to any shaft.

The unit is designed so that, when the clutch outside the anulus is off, it turns solid, with none of the gears turning against the others. Hence the drive shaft and the driven shaft turn at the same speed.

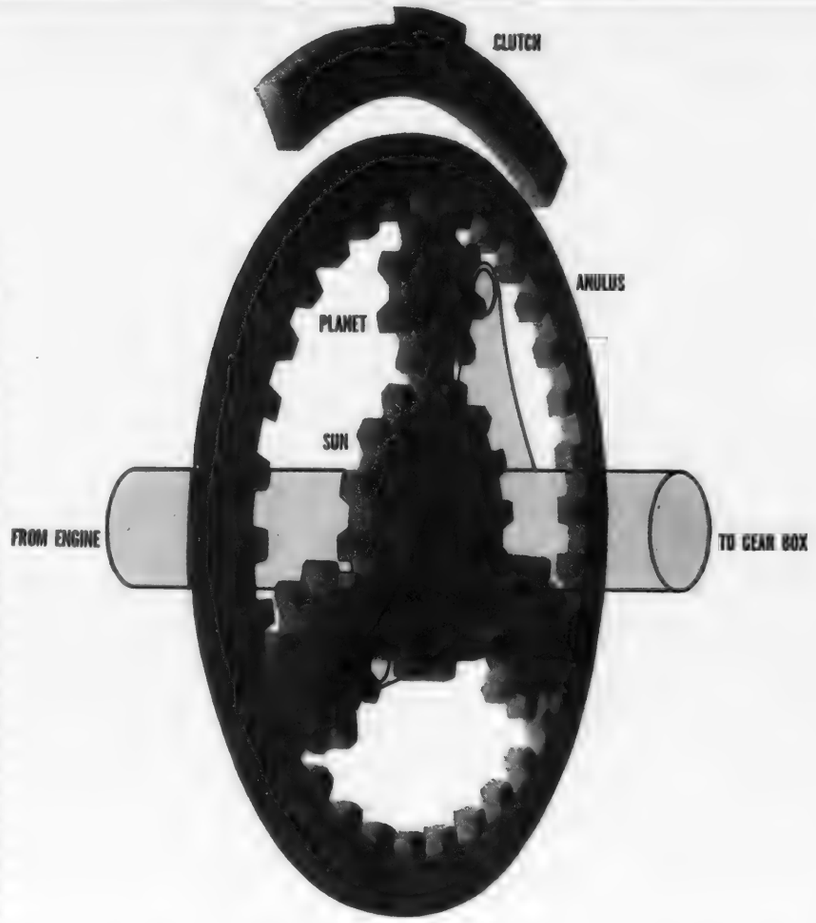
When the clutch is applied to the anulus, it stops turning. As the sun gear turns, the planets must rotate between sun and anulus, again like the ball bearings in a race. In this case the planets climb around the inside of the anulus, thus turning the tripod and the driven shaft—but at a slower speed than the sun gear.

In this gearing, the clutch application causes a gear reduction on the move, with full power still applied through the system.

This system, altered slightly to be more compact and to use a regular clutch, has been adopted by at least two of the major tractor lines—in International Harvester's Torque Amplifier, and Minneapolis-Moline's Ampli-Torc. In each case a hand lever controls the change, and the underdrive may be engaged in any gear, whether the tractor is moving or stationary. The reduction in speed and boost in torque varies with the different makes. The I. H. Torque Amplifier drops speed about 33 per cent and increases torque roughly 25 per cent. M.M.'s Ampli-Torc reduces speed about 40 per cent, and almost doubles torque.

Twice as many speeds are available to the tractor driver after the addition of a planetary gear. A five-gear model has ten speeds, six speeds plus this gearing give twelve—and in all cases there are two reverse speeds.

A sharp mechanical mind may have detected that the sun and planet device has a drawback—if *power* is applied to the shaft which is normally *driven,* it freewheels. The planets just spin around the sun. This only happens when the anulus is not held. In practice this occurs only when a tractor is running downhill, and the wheels are trying to push the engine. In this case, the braking effect of the engine on the wheels is lost. To prevent this, International Harvester added a special one-way clutch, which connects the engine and wheels if the tractor starts to over-run. Minneapolis-Moline does not have the attachment, but warns operators not to use the low range when driving downhill. It's fair



This is a diagram of a sun and planet gear. The unit used in a tractor is a modification of this, but operates in a very similar manner. The engine drives the center, or sun gear. The drive to the gearbox is taken from the small 'planet' gears, which are held on small axles fastened only to the output shaft. The outside gear, or anulus, which surrounds the planets, is not connected to anything, but can be held by a clutch. This system gives two speeds, and can change from one speed to another, without stopping. When the clutch is off, the whole unit turns (except the clutch) and the output and input shafts revolve at the same speed. None of the gears inside turn against each other. When the clutch is applied, it keeps the anulus from turning. Then the sun gear forces the planet gears to climb around the inside of the anulus. When this happens, the output shaft turns much more slowly than before, and as it reduces speed, it increases torque, or twisting power. When the clutch is released, the output shaft regains speed, turning the same speed as the input again. The clutch is hand operated on most tractors, and the lever looks like another gearstick.

This is the flip. To see the gears turn, hold the book close to the corner and flip the pages. Going towards the back of the book you will see how the sun and planet gears enable a tractor to shift to a lower gear without stopping. When the clutch is off the whole unit turns without any movement of the internal cogs. Apply the clutch and the sun gear turns the same speed but drives the planet gears more slowly. Flip from the back of the magazine and you see the change from low to high as the planet gears turning a circle first spinning, then not.

to say the low range is for heavy work, and you are unlikely to be using it when your wheels are running faster than the engine as you are when rolling downhill.

Another method of shifting gears while the tractor is moving is used by Allis-Chalmers and Oliver. The Allis-Chalmers Power Director uses a double clutch to give gear changes on the go. The main drive shaft powers one clutch, and through a reduction gear a second clutch, turning at a slower speed. Both are constantly turning. A hand lever—the "Big Stick"—operates this double clutch. Using the lever, the driver selects one of the clutches, and so transmits power to the gearbox. By changing the position, the other clutch is engaged, the first one disengaged, and a different speed is sent to the gear box. Thus moving the lever gives a gear change, either up or down as required, without stopping the tractor. Shifting down drops speed 30 per cent and raises torque 42 per cent. To give a smooth change, the clutches run in oil, and there is a neutral position of the handle that can be held if necessary. The Oliver Power-Booster is a similar "countershaft" device. It steps pulling force up 32 per cent and reduces speed 24 per cent.

So much for the working of the underdrive; what about its use? "It's mighty convenient," an Allis-Chalmers engineer explained, "but you have to sit in that seat, and feel that power come as you pull the stick. That's the only way to know what it will do. It will pull you through many a tough spot, and often enable you to work in a higher gear than you would risk without it." This, of course, saves gas and time.

But the picture is not all rosy. A complex transmission absorbs power itself. W. R. Dalenberg, of International Harvester, puts it neatly: "You don't turn gears over —or anything else—without taking energy to do it. Any device uses power, the trick is to get the one that uses the least."

The underdrive gears cost about an additional $150, varying with the make and model of tractor. However, they are inflexible. When you pull the stick you reduce speed and increase pull a fixed amount, whether you needed all that extra power or not. Some power is wasted even though the engine throttle closes. If you have to operate the underdrive often, you should probably be in a lower gear. But there is no denying their convenience in a lot of jobs.

The Draft Devices

Although strictly speaking not part of the transmission, draft control devices control depth, provide weight transfer to the rear wheels, and enable the tractor to ride through heavy spots. The last quality affects the design of a tractor transmission. Furthermore, they are flexible, in that they adapt to the load.

Basically all are the same. When a tractor with a mounted implement finds the draft load increasing, the hydraulic lift tends to raise the tool. But it only raises it far enough to maintain a selected drawbar load. A very small distance may suffice. Though the implement is raised only a fraction of an inch, it can lessen the load considerably. If 4 plows working a 4-foot cut at 4 miles an hour are raised a half-inch, they miss almost three tons of soil a minute. More power is saved as this soil is not lifted and turned.

John Deere, Ford, Massey-Ferguson, and Oliver all offer some form of draft control on some models. The Deere lift differs from the last three in that it will not raise the imimplement more than a pre-determined amount. After this the tractor will slow down. The Ford, Massey-Ferguson and Oliver would theoretically lift as much as necessary to maintain the same draft load, and so keep almost the same speed. In either case an operator should be able to tell if he is more often above his selected depth than not, and if so, choose a lower gear. Allis-Chalmers hydraulic system is somewhat different but also transfers weight to the rear wheels to increase traction.

These hydraulic muscles operate well. They keep the draft load relatively constant and so keep the tractor moving at its governed speed in the gear selected. An engine running at a steady speed wastes no fuel, and more ground is covered per hour or gallon since the tractor does not slow down to beat heavy soil conditions. However, the tractor has not done any more work, as it has reduced working depth in the heavy patches for maintenance of speed. But a draft control attachment does an efficient job of maintaining speed and avoiding gear changes. Furthermore, the draft control devices give a means of accurate depth control. They also cause more weight to be transferred to the rear wheels. Manufacturers claim this is more important than avoiding power-stalls or downshifting. But these merits are not connected with transmission so much as raising the standard of work done and preventing wheel slip. They could be incorporated in a tractor

(*Continued on page* 81)

By J. M. Elcazer

Christmas on Dutch Fork

CHRISTMAS IN THE Dutch Fork when I was a kid some three score years ago had a quality about it not found elsewhere. Our isolation and simple life on a hill farm in South Carolina gave it a special importance, and a special kind of observance. Santa Claus made his visit, it is true, and he brought us simple, but highly-prized gifts. But in the Dutch Fork, Christmas was not primarily a time for gift-giving—the big event of the season was the family reunion, dearer to our hearts, in our own remote valley, than any gift.

The elaborate preparation for the reunion started in late fall with a round of letters from distant kinfolk who would return to the ancestral homes there in the Stone Hills for the magic season. Long before Christmas we knew what trains to meet at White Rock, three miles away.

To the boys of the family fell the chore of getting in a good wood supply. We did that on Saturdays when out of school, for we didn't want to be bothered with that when the holidays came. In addition to plenty of small dry wood for the cook stove, which was cut during lay-by time the previous summer, we needed a lot of green, long-burning wood for the fireplace. All-dry wood made too hot a fire and burned up too quickly. A generous sprinkling of fresh green hardwood lasted longer, and it sizzled and sang as it burned, and cast soft, dancing shadows on the floor and walls on through most of the night. And a lot of big backlogs was essential, so we wouldn't have to be putting on wood so often. Some of these backlogs took two men to wrestle into the wide fireplace. But once bedded down there, and with smaller kindling under and around it, that log would often last all day and into the night, a gentle, steady fire that we liked. And when we went on the hunt by day, we knew at least its dying embers would still be red with warmth when we returned. A cord of wood was stacked in the sheltered end of the porch, handy and dry for the women in the kitchen.

The first big event of the season was the closing of school for the holidays. When that came we knew the glorious days were at hand. On the last day we took the teacher little, useless, home-made presents, and she gave each of us little bags of fruit and candy. That last day was long, but finally we heard the magic word, "Dismissed", and we ran from the room, calling "Merry Christmas" to the teacher as she poured what water was left in the bucket on the dying fire in the big rock fireplace.

The group became smaller and smaller as the paths divided up the valley and over the ridge, and at last we were home—two delightful weeks lay ahead. We put our books securely away, pulled off our school clothes, and put on our everyday ones. That was the perfect moment, when everything was right with the world. We were happy to be alive, for the greatest season of the year lay ahead, with none of it used up yet.

We eagerly watched for the mailman every day. We waited for his horse and buggy to round the bend below our place, and ran up to the house with the letters from our kinfolk, informing us when the clan would gather.

About that time we'd butcher, too. The thrifty Dutchmen of the Stone Hills know how to make many good things from a hog. And those who had drifted to far places were specially hungry for hog makin's they knew when they were young. Sausage! Nowhere else did it taste the same. Real sausage, to us, took a lot of seasoning; sage, garlic, onions, and the like, in addition to salt and pepper. And we didn't eat much of the sausage fresh. It would keep well and improve with age. We'd hang the sausage in the smokehouse, let it dry out a few days, and then smoke it with green hickory and corn cobs. Then it would be dry and stand like a walking stick.

For variety, hens and a goose or two were fattened in a coop, and the big Tom turkey which roosted in the tree beside the barn was destined for the Christmas table. There would be wild meat, too—rabbit and 'possum and quail, with all kinds of vegetables from mother's summer canning, and from the root cellar. Not the smallest reward of the season was the eating.

Every meal during Christmas week was a big one, but the table literally groaned on Christmas Day. Christmas dinner was at noon time. There would be a turkey and several other kinds of meat, both fresh and cured, every kind of vegetable possible, two or three kinds of pie, two or three kinds of cake. The kids ate until no more would go down. Food was pretty rich, and we weren't accustomed to that, and so for a long time after Christmas week we craved the simpler things. The day after our last company left we waded into a pot of sauerkraut and baked potatoes, and then we would vary that with cow peas and corn bread. Those things went well together, and our parents told us they were easy on the stomach and good for what ailed us.

It was some days after we got out of school before the company started to arrive. It was always by train, for there was no other way. The train into Dutch Fork came at 6 p.m. At Christmas time, that's after dark. I liked to drive the wagon out to White Rock station. We always wanted to get there an hour early. In that way we wouldn't miss, if our clock at home was wrong. So that put me out there by dusk, otherwise when I was young, they wouldn't have let me drive. And one of the visiting men drove back.

When we drove old Frank we had to hitch him in a pine thicket away back up there on the knoll, away from the station, near John Richardson's house, for he was terribly afraid of a train. Even up there, from the distant sound of it, he would still be in a quiver when we went to get him. And, as we drove back down to the station, he was hard to handle. Didn't even want to go that way. And we had to hold him by the bridle while the luggage and folks were loaded on. The one that held him had to leap on as the wagon came by, for old Frank was off and galloping from that place, smelling of cinders from the old wood-burner.

On the way home we had to go through a bog hole in Julian's Woods. The whole road was a quagmire, but that bog hole, several hundred feet through, always frightened me. We could easily break a trace or a singletree or bog down in the hub deep mud. I didn't try to direct Frank through the bog, just gave him the lines and let him go. He had a sort of sense that we didn't have for finding the best way through. When we got through, I was relieved, for from there on, the horse could trot some. And old Frank was thinking about that feed in his dry stable. We had in mind the good things we knew were being put on the table, for our folks could hear the whistle of the distant train and knew about how long it would take us to get home.

We were a sort of colony up there in the Dutch Fork. There were six houses of us there at Spring Hill, and the women folk worked out where each visitor was to eat and sleep, with later rotations. There were late arrivals and early leavers, and the schedules worked out for each home were

(*Continued on page* 107)

Feeding Wet-Weather

By Charles F. Rogers

Forage

Feeding Wet-Weather Forage

In many parts of the country, 1958 was one of the best years for growing forage and one of the worst for preserving it that farmers could remember. Now it must be fed. Tests of appearance, smell and content can be made to evaluate both hay and silage. Once it is preserved, poor forage cannot be improved, but much can be done to get by with it.

Cattle on a maintenance ration can be induced to eat enough of the poor material to keep them. This is done by improving the flavor by mixing in a little good quality forage, by feeding often in small quantities, by additives such as molasses, or by spraying the poor feed with one of the new flavoring materials. Animals in high production can be fed the poor forage along with a supplement which is planned, through the use of feeding tables, to give them the nutrients they need. Simple tests can help judge forage quality.

For Harvey Born, of Amherst, Ohio, each day last May was like the one before. It drizzled on Monday, poured on Tuesday, sprinkled on Wednesday, while the forage chopper and baler waited in the barnyard.

"I never saw such a hay crop," said Harvey Born, "and I've never known a wetter spring. Right then I knew all that water in the forage would be more of a problem come winter when I fed the stuff than it was at harvest time. Here in northern Ohio we usually get about three and a half or four inches of rain in May. Last May we got nearly nine inches, more than any season on record. How can you make hay or silage in such weather?"

Wet weather was not limited to Ohio. Last spring, parts of Iowa were completely washed out. Rain lashed the nation unceasingly eastward from the Missouri River across Iowa, Illinois, Indiana, Ohio, into sections of Pennsylvania and upward through New England. Meadow crops abounded, but the harvest bogged down. Earlier, a similar weather pattern had hurt the south, but there the excessive rain, combined with unseasonably low temperatures, held back the meadows. In Tennessee, rain fell almost continuously from November, 1957, through April, 1958. In many parts of Alabama, Mississippi, and the Southeast, forage crops were stunted and drowned out.

In the north, never had there been such wonderful legume-growing weather yet such a miserable hay-curing season. Legumes did look good, but the looks were misleading. The crops were washy, their nutrients diluted, and some of their growth-promoting factors lost or perhaps never produced. The best weather for tonnage may not be the best weather for the production of highly-nutritious forage. Last season farmers were forced into hoping that tomorrow would be good. Eventually the forage crops were hoped into a hopeless condition.

Every year the season is bad for someone. Someone gets caught with his hay down, or silage crops stand too long. Of the hay and grass silage lost each year, too much is the result of waiting too long. The problem of feeding such second-rate forage is always with us somewhere. When asked what to do with poor forages, I am tempted to advise that they be hidden in the nearest gully. As a farm owner, I watched my 1958 hay crop lose quality as the rain fell. My purpose is to seek a way out for those with brown hay or wet silages.

Flavored silage tempts cattle that would turn up their muzzles at the poor forages produced last summer. Vanilla, anise and other natural and synthetic flavors are being sprayed on both hay and silage.

What can one do to improve the feeding value of poor forage? There is one reply: *Nothing!* When the crop is preserved it cannot be improved. There are ways, however, to utilize to advantage feeds deficient in value. There are two ways; either mix the inferior feed with something or improve its palatability. You never improve the feed itself.

Often a feeder thinks that if he buys enough protein supplements, he can get by. That is seldom true. Cattle and sheep are built to get most of their nutrients, carbohydrates as well as proteins, from forages. They can and should get from 75 to 85 per cent of their nutrients from hay or silage, excepting, of course, fattening cattle nearing slaughter. With good forage, only a small amount of extra protein is required and it can be found in any home-grown concentrates such as corn, oats, barley. Liberal feeding of grains to make up for deficient forage is costly and often unwise.

With dairy cattle, beef cattle, or sheep, ruminants all, the feeding problem is much the same. They need highly digestible roughage rich in protein and energy. Carbohydrates supply the energy. Heifers, unbred ewes, growing beef yearlings on light winter rations, may all be fed considerable amounts of low grade forages.

Money-making livestock farmers like Harvey Born use approved practices. They follow feeding standards that work anywhere, that save money, give the highest production and assure animal health.

Sense and Census

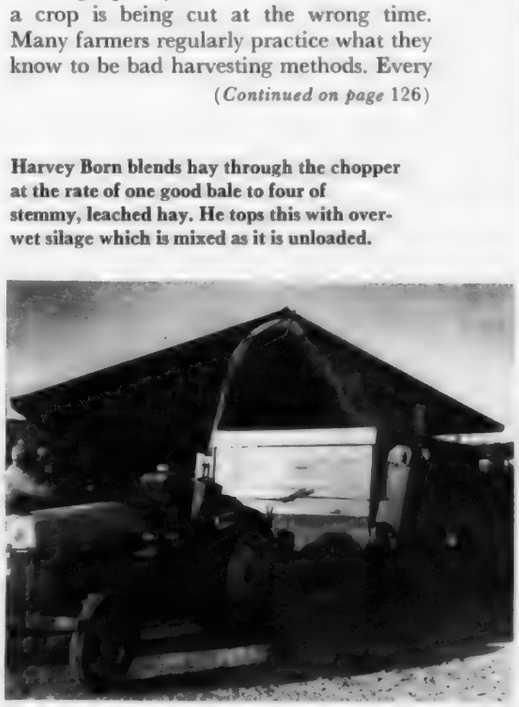
In talking about feeding cattle on his 1160-acre farm in Alabama, Dr. Ernest Judd, a physician, said, "I've found that, first off, a farmer has to use tables of feeding standards." He agrees with many wise feeders. Tables of feeding standards are available anywhere—from feed dealers, from supplement manufacturers, in books. The familiar Morrison's "Feeds and Feeding" is the best single source of such information. It contains in one table detailed analyses of hundreds of different feed materials. For example, there is the nutrient content of stemmy alfalfa hay and excellent corn silage. In other tables one can find the amounts of feed required by different animals at different levels of productivity. With some thought and pencil work, one can decide how to balance the feed on hand with the necessary feed purchases.

Figuring a ration is the same as making out a budget. You know how many dollars you have and you know how much beans and coffee and electricity cost and you know how much of these you must use. Then you do a bit of juggling until you balance food budget and dollar budget. Without a working knowledge of the nutrients in feedstuffs any feeding system is a hit or miss affair. Standard tables like Morrison's are more dependable than single analyses of one's own forages. It is just about impossible, for example, to get one good analysis of a barnful of hay because the difficulties of obtaining good samples are great. Standard tables, however, give the average composition of many lots of many kinds of feed in many stages of growth.

For immediate use, the eye and the nose and the hand are the best quick gauges of forage quality. Most feeders know when a crop is being cut at the wrong time. Many farmers regularly practice what they know to be bad harvesting methods. Every

(*Continued on page* 126)

Harvey Born blends hay through the chopper at the rate of one good bale to four of stemmy, leached hay. He tops this with overwet silage which is mixed as it is unloaded.



WHAT

EARLY THIS YEAR, as hog farmers gleefully tallied up their profits on $24 hogs and hopefully prepared to raise more hogs to make more profits, a small black cloud appeared on the horizon. High prices added up to more hogs, and more hogs to a drop in prices. Everybody saw the cloud and knew what it meant, but there was little or no agreement on how big it would get as the hog cycle rounded into the critical fall months of 1959. The first indication that the little black cloud might presage a mighty big wind came in August—on August 5 top price for hogs in Chicago was $24; by August 25 they had skidded to $20 and edged downward during the following weeks. There were prophets of doom, such as Kiplinger, whose newsletter predicted farmers would be taking $12, maybe as low as $10, for their hogs late in 1959. Kiplinger's forecast was based on an estimated 20 per cent increase of fall and spring farrowings.

This, everybody agreed, would be a knockout blow, not only to hog farmers, but to the entire agricultural economy, and something ought to be done about it. First, there ought to be an effort made to find out how much substance there was in the prediction of this drastic drop, and then, what management suggestions could be passed along to farmers.

The hog industry—the farmers who produce the hogs, the commissionmen who buy them, the packers who process them, and the specialists in government and the universities—have in the aggregate as good a pool of brains as any industry. THE FARM QUARTERLY went to these people and asked them two questions: (1) How low will hogs drop in late 1958 and through 1959? and (2) What do you suggest farmers do to combat this price drop?

In answer to the first question, there was general agreement that there would be a drop in prices in the late fall and winter of 1958, and a bigger drop as the hogs from a big spring (1959) farrowing got to market. There was no agreement on how large the increase in the fall, 1958, and spring, 1959, farrowings would be. The government, almost always on the strong side, estimated 20 per cent increase in the spring, 1959, farrowings, a little less in the fall, 1958, farrowings. Apparently the estimates depended on which set of statistics were used, and who did the forecasting. With the exception of a few bulls and a few bears, the prophets generally agreed that the anticipated low price for 1959 (in late fall and winter) would not drop below $15. The bearish Kiplinger forecast —$10 to $12 low—was shared by few; oddly enough the bears seemed to be concentrated among the commissionmen. There was a rare bullish element who believed the low would be $17 or $18.

It was pointed out that as numbers increased and the price declined, marketing would be at lighter weights; that beef will remain relatively high, affording added attraction to cheaper pork; that our population increase would take up some slack; that gluts would be partly neutralized by multiple farrowing; and that there would be some restraint among hog men in pressing for a maximum production.

The second question brought out a rash of answers. The most intelligent of them, as one would suspect, came from the farmers themselves. There was general agreement that as prices dropped hog farmers should stress economy and efficiency, market their hogs at lighter weights, stagger their farrowings to prevent gluts, and strive for a premium hog. There were very few who advised a drastic cutting down of production. It was generally agreed also that the hog farmer who set out to produce a given number of hogs, with his equipment and capital investment remaining static, could not economically reduce production.

There were comments about the favorable corn-hog ratio. In the fall of 1958 it was around 18, compared with 17 in 1957, and a 1949-56 mid-year average of around 13. A good deal more was said about the in-and-outer. The dedicated hog man holds the in-and-outer in little esteem, regarding him as a bad boy who throws the market out of kilter. But they say: "Give him enough rope and he will hang himself." There was a general demand for better reporting on trends, on-the-farm conditions, on-the-farm production, and a more rational extension of these facts to the future.

Following are quotes of four groups of men in the hog industry. Boiled down and digested these comments add up to a common sense program for future hog management on the farm.

William H. Walden, Bonner Springs, Kan., says, "A fellow's got to stay in to make money."

FARM MANAGERS

"Hog raising is like any other business, that is, there are times when it is unprofitable. However, if it is organized for top efficiency, the usual profits will make up for occasional deficit periods. Some of our better tenant farmers maintain that they have never lost money on hogs."

H. E. Stalcup, Secretary
American Society of Farm Managers,
Storm Lake, Iowa

"I am not sure that there is any practical formula as a cushion against what may be a big hog crop and resultant drop in prices in 1959. As long as we have as many farmers as we have in the country I am reasonably sure that diversified agriculture will prevail unless men go to frequency of marketing as they have done in the broiler industry."

W. H. Yaw
The Farm Clinic, West Lafayette, Indiana

"I am sorry to say that I do not believe that more than 25 per cent of the farmers will reduce their production plans or change their lifelong attitude of 'let John do it,' regardless of how often they are informed about overproduction."

H. M. Davis
Western Farm Management Co.,
Carmichael, California

"Fortunately, I do not quite agree with the experts who predict doom in the hog business. I do feel, however, that we will not have the prices we have had during this year. It is my conviction that hogs will not go below 14 cents next year. As to my recommendation, I think that any real hog farmer should set up his operation in such a way that it becomes as efficient as he knows how to make it and not fluctuate his operation with the market price. Just as cattle feeders have to set up their program and sell their cattle when they are ready, so the hog farmer has to develop the most efficient unit under his circumstances and stay with his program. I advise any farmer who handles hogs as a sideline to consider seriously whether he is interested in raising hogs."

Tillman Bubenzer, Manager
Conner Prairie Farms, Noblesville, Indiana

1. How low will prices drop?

PRICE HOGS?

2. What can farmers do about it?

"We do not expect hogs to reach the $10 level in 1959. We do, however, expect hogs to sell at about $13 to $14 during the last quarter of 1959 which means that with low cost feed grains the efficient hog producer may just about break even while those who are not as efficient will be sure to lose money.

"To the hog raiser Opekasit would offer the following suggestions: (1) Continue to produce the number of hogs that fit the farm, the facilities, and the ability of the man. (2) Give some thought to putting on pork with cheaper gains rather than faster gains, particularly on hogs going to market during the last quarter of the year. (3) Consider multiple farrowings, getting away from having litters come at just one or two short periods during the year, thus leveling out the supply of pork and reducing the pressure on prices. (4) Sell hogs at 200 lbs. Gains beyond this weight are more expensive and pork cuts from hogs of this weight will get better acceptance with the housewife.

"To the hog farmer, we offer a basic suggestion for 1959, and all years: Do not let yourself be swayed by yesterday's prices, today's prices, or tomorrow's prices, but rather be guided by making full use of all the facilities which you have at your command."

O. E. McBrayer, A.F.M.,
Manager Farm Operations, Opekasit, Inc., Hamilton, Ohio

SPECIALISTS

"In view of the record high hog-corn price ratio of the past year a sizeable expansion in hog production seems inevitable in 1959. Prices, therefore, will be much lower than this year. Whether the changes will be extreme is more doubtful. In the past, two years have usually been required for the hog industry to go from boom to bust. In only five years since 1924 have spring farrowings increased more than 10 per cent above the previous year, and two of these years were wartime while one followed the 1934 drouth. This history alone is somewhat reassuring. Year in and year out, hog prices will seek a level near a 12 to 1 or 13 to 1 ratio to the price of corn. The past year was in this respect the hog man's paradise, and it will not continue. But while a sizeable production increase is certain, there is always danger of overshooting the mark. How large the expansion will be depends on how well farm magazines such as yours, government agencies, and others publicize the danger. My advice is to increase, but not too much. To the individual farmer I would add, 'In making your plans, count on considerably lower prices next fall than in the past two years.' The hog outlook is tied up with the cheap feed prices in prospect."

Harold F. Breimyer, Head
Livestock Section, Statistical and Historical Research Branch, U. S. Dept. of Agriculture.

"During 1959 we expect hogs to be down to around $14. Indiana farmers do not fluctuate marketings as widely as other states. They will try to market them earlier to get them in before the big runs next fall."

Clifton B. Cox, Professor, Ag. Econ.
Purdue University

"Increased production does not have to be a case of too many hogs. Abundant corn and beans means an opportunity for the farmer to purchase feed at low, harvest-time prices. The efficient producer will realize very economical gains even on a low market."

Aldon H. Jensen, Asst. Prof.
Animal Science, University of Illinois

"Forecasts that in 1959 hog prices may drop to $10 are unnecessarily gloomy. While the outlook for 1959 is less favorable than in 1958, a five or six per cent increase in hog numbers will not cut prices in half in 1959. Among the great needs in agriculture are (1) more coordination between production and marketing, and (2) regularizing and stabilizing the flow of hogs to market."

Norris J. Anderson
Extension Economist, State of Nebraska

"Apparently some of the so-called experts are comparing two unlike things, i. e., summer high prices with late fall or winter low. That makes a spectacular but highly misleading comparison. There is much talk of $30 cattle—$10 hogs and $30 cattle is an unprecedented situation. Hog producers got high prices in the past two years by giving up a substantial part of their market each year. That is a pleasant way to go out of business. If hog producers are to retain their present share of the meat market or regain some of it they have lost, they can do it by (1) producing a better quality product, (2) offering a more constant supply, (3) selling at more competitive prices."

L. H. Simerl
Extension Economist in Marketing, College of Agriculture, University of Illinois

"If the number of hogs do increase as expected, swine producers can help by marketing at lighter weights."

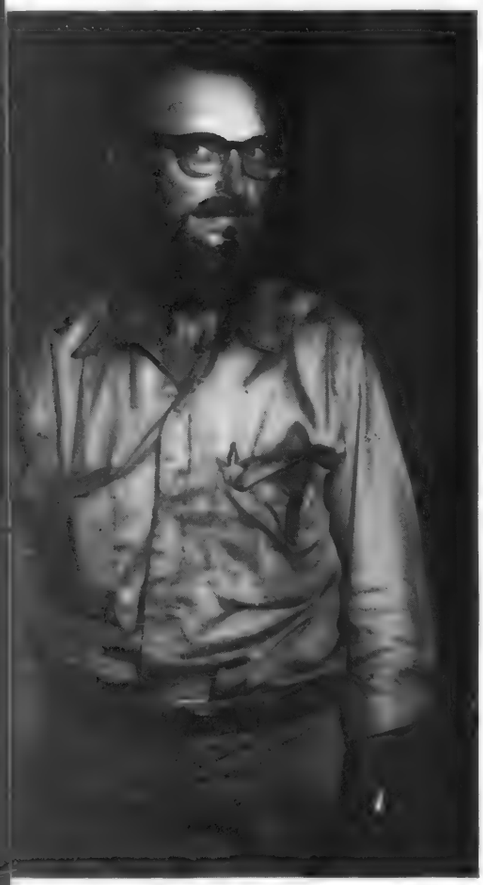
C. C. Bowen
Extension Specialist, Ohio State University

"If the 14 per cent increase in hogs raised this fall is carried out by farmers, we look for some possibility of $12 hogs in the latter part of 1959. However, with low feed prices this could mean a hog-corn price ratio which would not fall below the break-even point."

Houston E. Ward
Associate Extension Economist,
Oklahoma State Univ., Stillwater, Okla.

John Munsterman, Montrose, Mo., says, "I never could see plunging into something when the price is high and running when the price drops."

Virgil Boston, Holden, Mo., markets 20 to 30 hogs every month of the year, will increase next year. He says, "If the price is high I'm in luck; if it's low, I lose a little."



"The 1958 fall pig crop was 10 to 15 per cent higher than a year ago; farmers are planning an 8 to 10 per cent larger spring crop. Such an increase would mean $5 to $7 lower prices next summer and $3 to $5 lower prices next fall (1959). This is no time for a beginner to jump into hogs, expecting to make a killing. The experienced hog farmer will likely find that hogs in 1959 will give him his best alternative use of his feed. He will want to farrow his hogs as early as possible to get the benefit of the seasonally higher summer and fall prices."
Francis A. Kutish
Livestock Marketing Specialist,
Iowa State College

"I certainly do not want to see prices go too low, but it is about time the stockman who is raising honest, lean-meat hogs gets what they are worth in comparison to those who are raising the wrong kind. I can see producers of top lean-meat hogs receiving $2 and $3 more than for average hogs."
Willard D. Brittin
American Berkshire Association,
Springfield, Illinois

"Ironically, I do not believe that the hog-raising farmer is a factor in influencing market trends. The 'year-in, year-out' experienced hog-raising farmers know how many hogs they can efficiently market annually with their facilities, manpower and home-grown grains. They pay no attention to market trends but steadily follow their established pattern of production. Their averages, over the years, sustain them at a good earning level. They are a clear-thinking class that should not be interfered with. The 'in and outers' are the real blight to the industry. They usually get in too late and get out too late, all of which makes them net losers. I doubt if any amount of persuasion would curb this fallacious practice. The latest, and probably the most ominous practice that threatens the market, is integration. We refer not to the integration of farming operation but to the feed-selling groups who are seeking a captive market for their products. The exploitation of a strong capital position could, theoretically, 'football' the entire industry into peonage. But in practice I doubt if they can inflict more than a temporary injury. Swine production requires more good management at the intimate level than the mechanics of mass management can provide over the full six months finishing period."
Louis Brunke
Anchor Serum, Indianapolis

Packers

"I can't quite believe that the price of hogs in the fall of 1959 will be anywhere near $10. If feed costs are low, the over-all cost of producing a hog is low, and if the farmer's profit comes from the spread between his selling price and his cost, then the price level is relative."
J. L. Crowley
Cudahy Packing Co., Omaha, Nebraska

"We are fully appreciative of the potential price problem facing hog growers should the prediction of a 14 per cent increase in the fall pig crop be realized. Consumer income and the supply of competitive meats are other factors in the price pattern. In our opinion, however, $10 hogs are extremely unlikely unless marketings turn out substantially greater than anticipated. The fact that the 1958 spring pig crop was originally forecast to be 6 per cent over the previous year's crop, only to turn out as a 2 per cent increase—serves to illustrate the human factor in hog production."
V. E. Franz
Swift & Company, Chicago

"I do not happen to agree with the 'Voices of Doom' forecasting $10 hogs in 1959. I believe that an economy that could support 23-cent hogs for an extended period of time will certainly provide enough purchasing power to prevent hogs from reaching $10 levels. I feel that farmers should at least hold the level of hog production as it is now, or possibly increase same on a multiple farrowing basis. Price troubles on hogs have come not so much from over-all numbers as from bunching of numbers within a short period."
Milton J. Schloss, President
E. Kahn's Sons Co., Cincinnati, Ohio

"It is widely recognized that percentage change in prices is not parallel with percentage change in supply and that small changes in supply can result in appreciable changes in price. Our people believe that if we had monthly data on farrowings, we could plan our operations much more efficiently and, of course, such data would provide hog producers with a basis for planning their operations. Perhaps the two and three sow farmers would not pay much attention to data of this sort, but the big commercial producers who practice multiple farrowing certainly would welcome more information on supply."
E. L. Heckler
Armour and Company, Chicago

Commissionmen

"What the farmer does in the way of breeding in the spring of 1959 will be most important. It could determine whether we have $10 or possibly $14 or $15 hogs later next year. Our suggestions to them will be to continue their efforts to produce quality hogs and a more acceptable product for the consumer."
J. Henry Campbell
Producers Commission Association,
Chicago

"With all this cheap corn around, I doubt if farmers will listen to any suggestions about cutting down production. I believe that hogs will not go below $17 in Chicago and Omaha during 1958. I furthermore believe a decided drop will take place in February, March and April to $12 to $13.

That is as far as any degree of accuracy can be projected. I do feel that if things look like they do now $10 in 1959 is possible, but not until November or December. Most of the big packers are guessing $15 or $16 low for their hog costs this year."
Frank West
F. R. West & Co., Omaha, Nebraska

"I do not agree with those who paint such a picture of gloom as ten-cent hogs. Certainly hog prices will drop. If I were a hog farmer I would concentrate on producing an honest hog, a hog with a high dressing per cent and high primal cut yield. If I market such a hog when prices are high, the buyer will remember me when prices are low. I'll get top price, and maybe a premium, and I'll continue to make a profit."
John F. Hughes
Phoenix, Arizona

"We feel that if enough people talk about hogs, and talk about the prices being reduced to the place where they will lose money, that it will have the tendency to curtail production. Certainly the thought of ten-cent hogs is alarming enough to attract their attention."
T. W. Fife
Producers Commission Association,
Sioux City

"I would say that while we have some people here at the Omaha market who go along with the doleful view of Kiplinger, the Wall Street Journal and government forecasters, more do not. Most grant that hogs will be lower late this year, again next spring, and then again in late 1959—the sharpest break then, but generally are of the opinion that even at the low ebb, hog prices will not be as low as $10."
Hart Jorgensen
Livestock Foundation of Omaha, Neb.

"I am not nearly as pessimistic on the hog market as some of the professional prognosticators. The 12-day decline in the hog market at Chicago in August was the longest downward run without a break that I have seen in my 50 years in the hog business. This did a lot to clear the market and serve as a warning to any hog raisers who might go overboard on their farrowings."
Les Brock
Norris-Brock & Co., Cincinnati Union
Stock Yards

Hog Farmers

Virgil Boston, Holden, Missouri, markets 20 hogs every month of the year, leveling out his profits, avoiding the valleys and peaks of the market. He says, "I used to run to market twice a year but the last few years I've been farrowing every month. As for 1959," he says, "I'll ship 300 to 400 hogs next year, I guess, about the same as this year. If the price is high I'm in luck. If it's low, I lose a little."

William H. Walden, Bonner Springs, Kansas, will continue his present program in 1958-59 of farrowing twice a year and marketing at 220 pounds. And what will he do to offset a big drop in price? He says, "If we go to 11-cent hogs again it won't break me, just hurt me. A fellow's got to stay in to make money."

John Munsterman, Montrose, Missouri, says, "We'll keep what we got, neither increase nor decrease our production. I never could see plunging into something when the price is high and then getting out when the market drops. The way markets and prices on things we have to buy stand, it'd be foolish to go too heavy into any one thing."

C. A. Lebold, Dover, Ohio, R. R. No. 3, has Spotted Poland Chinas and markets about 150 hogs per year. He has a very large farm, but it is diversified with the emphasis on his dairy, since he is close to Cleveland. He bought spoiled wheat at 65 cents a bushel. Since he will have cheap feed he will increase his farrowing. Here are some of his comments: "Through good times and bad I plow through. I have seen hog prices go up and down, and no one was ever able to tell me exactly why they went up and down. Big supply didn't seem to have very much to do with prices. As long as fixed costs remain the same I don't look for much change in hog production even if the prices are low. I intend to produce more hogs in order to keep up my profits."

Carl Klein, Camden, Ohio, raises Durocs and fattens and markets 700 a year. He said: "I am going along with the same program I have now. My advice to other hog men is to stick in the game in both good times and bad. We can't expect to always make a big profit. We never will get what we should have until our farm problem is solved. I don't think it will be solved in Washington. They are making a mess of things there." Klein bought a good deal of spoiled wheat last fall.

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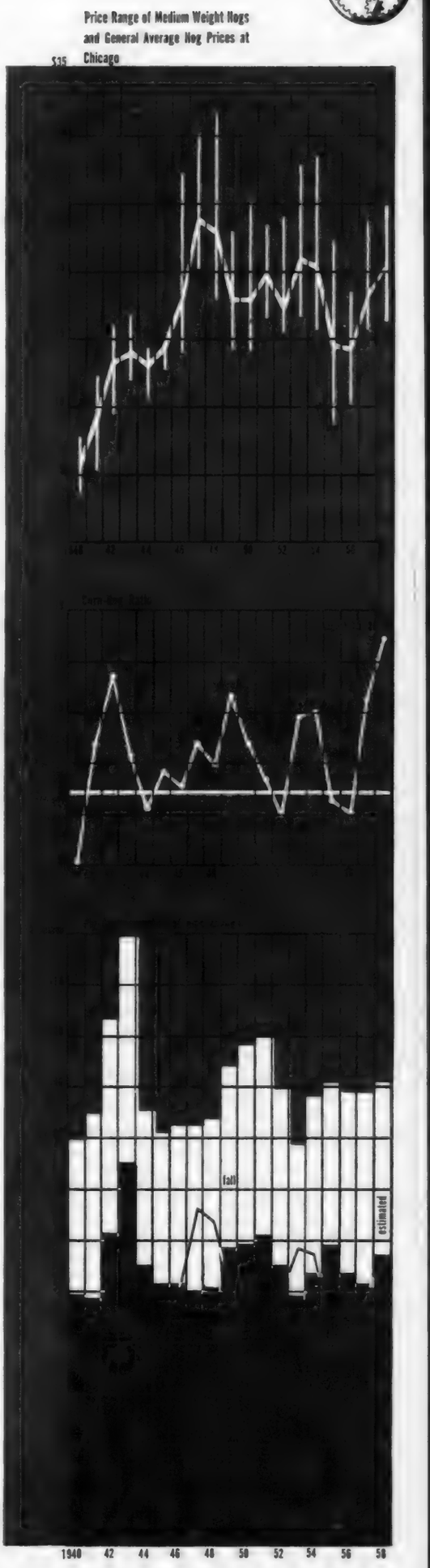

The charts are a graphic presentation of the economic factors which determine hog prices. The reader can use them as the basis for working out his own opinions on market trends for the coming year. The top graph shows the high-low range of prices for medium weight, 195-225 pound hogs from 1940 through October 23, 1958. The line running across the chart indicates the general average price of all hogs for the same period. The center chart shows the fluctuations in the corn-hog ratio (the number of bushels of corn approximately equal to the price of 100 pounds of live hogs). The straight line indicates what is considered to be the general long term average. In August, 1958, the ratio was at an extreme peak. The size of the spring and fall pig crops (number of pigs saved) is shown in the bottom chart. The fall crop for 1958 is estimated. The line running across this graph is the average price of hogs taken from the first chart and superimposed here to give a quick comparison of the relationship between supply and prices. Pig crop figures are from Agricultural Statistics, USDA, all others from the Yearbook of Figures, Chicago Daily Drovers Journal.

Stran-Master

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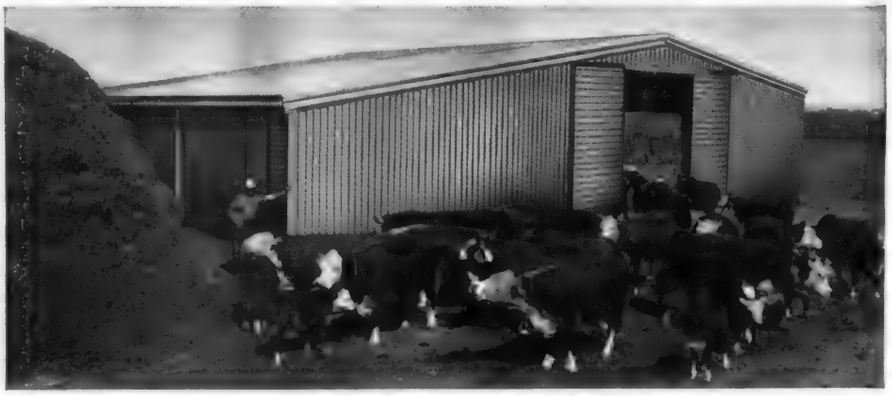

Livestock shelter plus feed storage

Open shed for shelter and feeding is combined with totally enclosed area for hay and grain storage. A 48′ x 48′ Stran-Master like this, in Stran-Satin Color, takes an initial investment of only 25% down.

Now with baked-on colors

THAT WILL NOT BLISTER, PEEL OR SUN-FADE

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Partly open side provides easy access to spacious storage area. Repair center and tool shop is in enclosed section at left. Initial investment of only 25% down for this 48′ x 64′ Stran-Master with choice of six colors.

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Price example: STRAN-MASTER 24′ x 32′ requires only $215 down . . . F.O.B. Factory for do-it-yourself construction.

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Rush the new Stran-Master catalog and information on Stran-Satin Color.
I'm interested in a building approximately _____ ft. x _____ ft.
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Stran-Master, priced at less than many wooden pole barns, now offers a choice of six rich colors that outlast paint by years: blue or bronze, grey or green, rose or white. Use them separately or in any combination. The factory-applied colors are baked on to the zinc coated steel panels in double layers of vinyl aluminum to make distinctive farm buildings that keep their colorful good looks without costly maintenance.

The multi-purpose Stran-Master serves any farm storage or shelter need. Any size or design can be erected in a few days by dealer's crew or your own. Five-year purchase plan requires only *25% down payment*, financed through your own dealer without affecting regular credit lines. Mail coupon for details or contact your Stran-Steel dealer. He's listed in the Yellow Pages under *Steel Buildings* or *Buildings—Steel.*

THE NEW TRANSMISSIONS

(*Continued from page* 71)

in addition to a transmission device—and they would still be an improvement. The draft control is a way around; not altering the deficiencies in the transmission, but compensating for them. These deficiencies had to be corrected in the transmission, and one solution is the torque converter.

The Torque Converter

The torque converter automatically multiplies torque and reduces speed in relation to the load on the drawbar. There is a maximum to this increase in torque, but it varies with the design of the converter. First in the wheeled tractor torque converter field by several years was the R. H. Sheppard Co. of Hanover, Pennsylvania, with a torque converter on its Diesel tractors. Most Diesel engines have a limited range of efficient speeds, and benefit even more than gasoline engines from a transmission which compensates for this. Case and Oliver also offer the torque converter on wheel tractors. Oliver has it only on its largest model, the 995, while Case has it on three models—the 400, 600 and 800. Oliver calls it the Lugmatic, Case uses the trade name Case-o-matic. Case-o-matic will double torque in any gear, while Lugmatic will increase torque up to 2½ times normal for that gear. Both converters are similar, except the Case-o-matic can be locked solid, becoming a fixed gear tractor. Thus the operator can choose either drive, as needed.

The principle of a torque converter is simple. If you place two fans close together, and start one, the other turns in the blast of air. The first is pumping air, driving it through the blades of the other, which acts as a turbine, turning in sympathy. A torque converter uses oil to transfer motion. But there is still no mechanical connection between input and output.

The tractor engine is connected to a pump, or impeller, which sits in a bath of oil. When the engine turns, the impeller blades spin the oil out sideways, whirling it with great speed. There it hits the blades of the turbine which turn like the blades of the fan. The converter housing is shaped to guide the oil so it all passes through the blades of the turbine. After the oil has hit the turbine blades it runs through a set of stationary blades. These blades are fixed to the housing, and direct the oil back to the impeller and around again.

How does a converter increase torque when it reduces speed? Think about a stone grist mill driven by a water wheel with the wooden buckets circling around. Suppose each of the buckets could hold ten gallons. When the wheel spun fast, each bucket would catch only three gallons of water. But when the stone millwheels bit into a bushel of wheat, the load grew heavy, and the water wheel slowed down. As it did, each bucket was under the stream longer, filled with ten gallons of water, and then applied a bigger twisting force—or torque—

If this is the kind of game bird hunting you want

we can tell you where to go to find it...

If you are looking for a good place to hunt game birds, nearby, where you can be sure of plenty of targets of meaty, plump pheasant, quail or partridge, along with safe hunting conditions, we can help you.

Commercial shooting preserves, stocked with plump, meaty birds, and sporting a six-months open season, offer an excellent place for you to go and get your fill of game bird hunting at a reasonable fee.

Maybe you have been reluctant to try hunting at a commercial preserve because you think it will be too tame for you after hunting in the wilds. We wager that you, like other red-blooded hunters who have tried it, will return with full bags of game, rarin' to go back as soon as you can.

If you would like a list of the names, addresses, hunting seasons and other information about reputable shooting preserves in the United States, write for a FREE copy of Purina's 1958-59 Directory of Game Bird Shooting Preserves. Send your request to Mr. Bruce K. Symonds, Ralston Purina Company, 2112 Checkerboard Square, St. Louis 2, Missouri.

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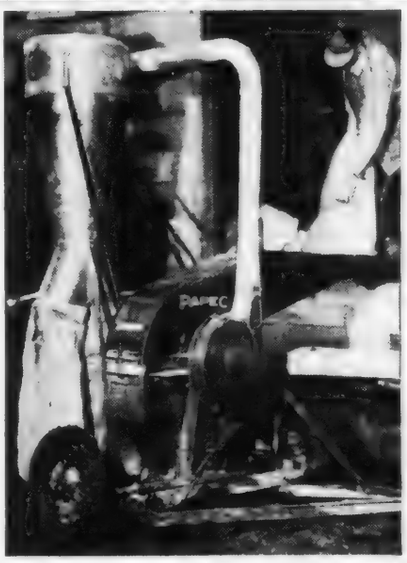
Grind where the grain is...

with a Papec portable power take-off on a Model X mill. Haul it anywhere, start grinding the minute you stop the tractor. Starts at $215 f.o.b. Shortsville. *Guaranteed* to outgrind any other mill in its power class! See it at your dealer's or write for free folder. Papec Machine Co., Shortsville, N. Y.; 243 W. Merrill St., Indianapolis, Ind.; 2925 Chrysler Rd., Kansas City, Kan.; 18 N. Tyler Ave., Hopkins, Minn.



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Auto-Lite Transport Spark Plugs . . . best for heavy-duty service

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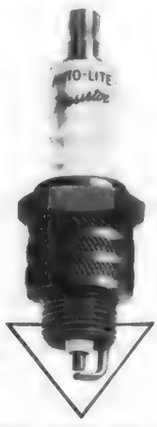
- **HEAVIER INSULATOR** gives greater resistance to high-voltage leakage and breakage.
- **INSULATOR TIP** ignition-engineered for longer, cleaner life—safeguards performance.
- **OVERSIZED ELECTRODES** of special alloy give maximum resistance to heat and electrical erosion.

Auto-Lite makes a complete line of spark plugs . . . tops for every engine

Auto-Lite makes a complete line of ignition-engineered spark plugs for passenger cars, trucks, tractors, power mowers and outboard engines, and for auxiliary farm engines. Included is the Auto-Lite Resistor Spark Plug with Power Tip that "fires up" today's passenger car engines at *all speeds*. For full power in any engine . . . be sure you install Auto-Lite Spark Plugs.



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to the millstones. When the load eased, the wheel spun faster again.

A torque converter is the same. It automatically adjusts the torque in the output shaft—up to a maximum depending on design. It *does* not increase horsepower. It provides more torque by sacrificing speed. A torque converter operates most efficiently in a certain range, depending on its design, the angle and shape of the blades on the turbine and impeller. Compare this, if you like, to a small fan driving a large one slowly, or a large fan pushing a small one fast. The efficiency loss comes when the blades of the fans are overloaded with air.

Even under the best conditions, a torque converter wastes some power. But outside its efficient range much more is sacrificed. This power swirls the oil around uselessly, and is wasted as heat. For example, when the wheels of a tractor are stationary, and the engine is running, the torque converter is slipping 100 per cent. All the power is wasted, and turns to heat. If continued for any appreciable time the tractor would boil, if the oil is cooled by a radiator in the water jacket. Other types have a separate cooler for the converter.

Some manufacturers believe a torque converter does not allow a tractor to work with fewer gears. They contend gears were eliminated to reduce the extra expense of the converter. But, they claim, this did not increase the work capacity of the machine. With plenty of gears, an operator will be able to pick a higher gear, and when he hits heavy conditions, the converter will match engine and load requirements. When the rough place has been passed, it will raise travel speed again. Engine speed should never change. Notice the converter reduces speed only until it has matched the load. Other firms say the very nature of the torque converter lessens the need for a large number of gears.

There is no doubt a torque converter drive is more fuel hungry than a standard gearbox. But under certain conditions their ability to match engine and load precisely can do more work in a day. Estimates vary on how much more fuel is used. Oliver claims 5 to 10 per cent an hour more for their Lugmatic. Caterpillar estimates 5 to 25 per cent with conditions.

Claims and counter-claims have made many wary of the torque converter. The ignorant have attributed both untrue advantages and untrue disadvantages to the converter. Among the substantiated claims are ease of handling, and longer life of some parts. —like tires, and less plowshare breakage. A heavy load can be moved away from rest with no clutch slipping, or held on a hill without using the brakes. Owners claim the smooth power enables them to get on the land earlier in the year without excessive slippage. Because of this precise control of power, some tricky operations can be done safely—such as starting a load uphill—because the power is applied slowly, and cautiously. There is less danger of a sudden jerk raising the front of the tractor and causing an overturn.

A torque converter will partially absorb shock loads, and so reduce maintenance costs. Some of the engine wear that accompanies lugging is avoided. But the converter still transmits enough of the shock necessary for dozing work. Even when a load stalls the tractor, it doesn't stall the engine. This can be very useful when doing delicate work. R. H. Sheppard, of Sheppard Diesels, said, "If you are picking corn, and feeling your way around a corner pulling a corn picker and a heavy wagon up a slight grade, you are apt to stall your engine. You may also find your tractor has drifted backwards, sometimes buckling the power take-off shaft of a tractor-powered picker. With a torque converter, this never happens. Another aggravation that is eliminated is in hitching up to an implement of any kind. Here your perfect control pays off in preventing accidents, both to people and machines, and in generally preserving your disposition."

Tractor manufacturers realize the torque converter is not universally acceptable. They still offer the regular transmissions in the same size of tractor for the farmer who is not suited by the new devices. They do not try to convince buyers that a new device is always the better choice.

Most companies freely mention the losses that accompany the convenience of a torque converter, and emphasize certain conditions do not merit the extra expense. The Caterpillar Tractor Co. expresses this best: "There is a loss of power in the torque con-

verter. This power is given off in the form of heat in the converter, and is dissipated in the cooling system. Because of this, *at any given speed,"* said a Caterpillar engineer, *"if the direct drive tractor is in the correct gear, it will be able to exert more pull than a torque converter.* Stated another way, the direct drive tractor, in the correct gear, will be able to exert the same pull as a similar sized torque converter tractor, but at a faster speed."

Sheppard explains this further: "On the other hand, when you overload a torque converter to the point where the input and output shafts are going at quite different speeds the converter turns some of the apparent 'slip' into torque so that although some power is lost most of it becomes increased torque. This means if you are plowing with a torque converter in 5th gear, for example, and run into a difficult spot which ordinarily would cause you to change gears to get through, you would do absolutely nothing. The torque would increase as the tractor slowed down until you had a torque equivalent of 4th gear, then 3rd, then 2nd and finally 1st before your tractor (but not your engine) would stop."

To put these advantages to work adds to tractor cost as well as fuel consumption. The Case-o-matic costs $250 to $400 extra; on the big crawlers it can run as high as $3,500 extra. That's before you pay the fuel bills. They are bound to be higher, and it takes a wary operator to get more work per gallon than with a regular drive.

A sleepy driver can struggle along in the wrong gear and drain fuel out of the tank like water in an irrigation line. And if the going is level and uniform there is not much advantage to torque converter except in operator comfort.

A prospective buyer should be sure demonstrations are fair to the competing tractors. Often they favor the dealer's machine with conditions the farmer will only seldom encounter. Any torque converter tractor can outpull an opponent from a standstill, because only a torque converter can give full engine power to the wheels when they are not turning. The other tractor slips a clutch, loses power and either stalls or is

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SHRED STALKS and STUBBLE. Turn waste into rich fertilizer. Helps destroy insects. Makes clean plowing easy. MOW pastures, lawns, all types of grasses. CUT largest weeds and vines—brush up to 3" in diameter! Costs so little you can't afford to be without. Advanced design. Exclusive features. Quality built. SIZES and MODELS FOR ALL JOBS and TRACTORS.

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More than 10 years have passed since Hahn introduced the original and only Hi-Boy self-propelled, high-clearance sprayer and duster. Each of these years has seen the Hi-Boy remain first in its field, favored by farmers over all comparable equipment combined! For good reasons, too — because each year has seen the Hahn Hi-Boy keep pace with the rapid progress of agricultural chemicals — with each new model designed to promote proper applications of chemicals at the right time to assure maximum results per dollar spent!

All advances have been developed by Hahn spraying specialists to improve application of the ever-greater variety of spray materials and liquid fertilizers . . . many of these advances achieved through teamwork with producers of such chemicals, with agronomists, and with farmers themselves. These same specialists are ready always to help any user of Hahn spraying equipment get fullest benefits from it, at no cost or obligation. And the new 1959 Hahn Hi-Boy is ready now to help you enjoy record yields and profits. Mail coupon for newest data on spraying advances and name of your Hahn dealer.

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Send me latest data on spraying techniques and chemicals for crops checked: ☐ Cotton ☐ Corn ☐ Tobacco ☐ Soybeans (list others in which you are interested here).....

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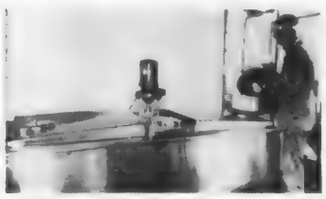
Special Report on Bulk Milk Cooling

Tips on Planning for a Bulk Milk Cooler

Whether you're going bulk now or intending to do so in the future, prior planning can save you money, assure you the best possible installation. Here are some points you should take into consideration.

First of all, be sure to check with your local milk authorities and your milk processor. Cooperation between inspector, hauler and dairyman is a must . . . and can really save you money.



The Sunset "Low Line" Cooler is easy to pour into, easy to clean.

When planning your installation, take a good look at your entire dairying set-up and *allow for future expansion.* The size of your cooler will be determined by the size of your milk house, your daily milk production, and whether you'll have daily or every-other-day pick-up.

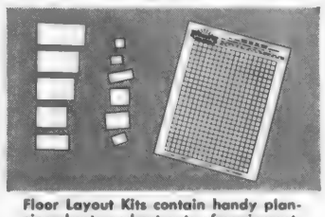
Install your compressor by window or in wall opening, for best ventilation . . . lowest cooling costs.

Sunset makes a cooler for every possible need . . . You have three designs and eleven models to choose from. For example, if you want a maximum capacity cooler that can be installed in a minimum amount of floor space, it's the Sunset Space Saver.

If building or remodeling, provide for adequate drainage, using water seal drains to eliminate odors. A bulk cooler requires 230V electrical service. When rewiring, provide for this. Plan your milk house big enough for the cooler and allow large enough door openings to get it in. If building or remodeling, you can save money by installing hose ports now. Units that meet sanitary requirements are available through your local Sunset Dealer.

Large covers and low height make the Sunset tanks easy to clean.

Get a good tank, one that has been field proven, accurately calibrated at the factory and properly designed to eliminate warping. Sunset tanks are ruggedly made of the finest stainless steel. They can't warp or sag . . . Calibration stays accurate.



Floor Layout Kits contain handy planning sheets and cut-outs of equipment.

A well insulated tank is very important. The insulation in a Sunset tank is hermetically sealed . . . water cannot get at it.

You want a cooler that will cool your milk quickly, uniformly, and with a minimum operating cost. Sunset's Positive Refrigerant Control is the most efficient and economical cooling method on the market today. Sunset's operating costs are lower than other coolers.

FREE PLANNING HELP . . . Write for your copy of the Sunset Bulk Cooling Profit Book. It contains information on milk house planning, methods, cost breakdowns. Also ask for your Free Floor Layout Kit. Write today.

Pick your cooler from 3 designs; 11 different models

SUNSET MILK COOLER®

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out-pulled. Similarly, it is easy for a fixed drive tractor to show far less fuel consumption for work done on level, smooth ground under uniform conditions. If you base your decision on a demonstration, make sure the conditions are the same as on your farm, and the tractor is doing jobs you will do—or you may be disappointed. When you get a new attachment, learn how it should be used. Dealers are instructed by their companies in the operation of their tractors. Ask them. A newcomer can select the wrong gear and waste a lot of power.

Similarly, it is easy to choose too high a gear with a torque converter until you know the machine. In this gear the converter works in an uneconomical range, turning your fuel into heat instead of land work. This may not show up to the inexperienced until the fluid begins to overheat, perhaps an hour later. To the wise, the slow speed of the tractor will warn of the wrong gear.

But we are in the middle of a development story. Transmissions are coming with newer convenience, and perhaps new drawbacks. One firm, within the next few weeks, and at least one other in a matter of months, will offer an even more complex gearbox. Transmissions in the experimental stage have features now found in large earth moving machinery—and automobiles. They will probably have power shift throughout their range of speeds. They may have fluid couplings, or torque converters. There will be no shift lever, and gear changes will be made with a small finger-tip selection lever.

The convenience and ease of shifting will allow a driver to upshift, or downshift to any gear he needs, without stopping. For pto driven machinery, this will mean the ground speed can be varied to match the crop without stopping to shift, and without interrupting power flow to the pto.

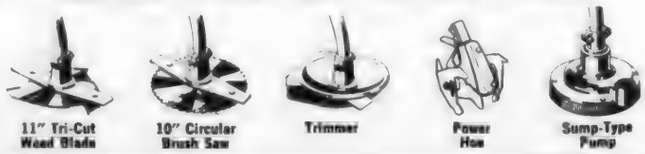
One thing has improved consistently—the farmer's choice. The industry will strive to give the farmer a superior tractor which will increase his earning power. The farmer has to follow the changes, and buy only that machine which will serve him best.

NEW! **COMET POWER SCYTHE**

2½ H.P.

Here's a new portable power clearing tool designed for many, many uses. You can cut and trim with it just about six times as fast as you can with weed-whips, swing-scythes, brush-hooks, clippers or axes. And you can even pump with it—basements, boats, etc. The Comet Power Scythe is low in first cost . . . economical in maintenance and operation cost. The engine is a Clinton 2½ h.p., 2-cycle. The unit weighs only 28 lbs. and it utilizes balanced weight positioning from a single shoulder suspension strap. Real easy to handle! You need this powerful, labor-saving equipment. Don't buy any portable power clearing equipment until you see it. Write for literature to COMET INDUSTRIES, 801 Elm Place, Richmond, Indiana.

Good Dealer Territories Open. Write NOW For Details.



BUNDLING—THE GENTLE ART

(Continued from page 57)

branding it a major social evil. There is a well documented report on a Rev. Seth Pethwick who carried on a most vigorous crusade against bundling. In spite of female hecklers in his audience, he promised fire and brimstone for bundlers. But he met an untimely end. Late one winter night he pulled his horse into a farmer's barnyard and asked for shelter. The farmer cordially invited him in and sat him down to a big supper. Soon after, begging fatigue, he asked to be shown to bed. The farmer told him he was to bundle with his daughter in the only available bed. Rev. Pethwick's reputation had not seeped into the Vermont hills, and the farmer was not prepared for the explosion of unbuttoned wrath. "I would rather sleep outside in the cold than become a party to this sinful, this evil practice," shouted the parson.

"You shall have your wish," said the farmer. "No foreigner is going to come into my house and tell me I'm a sinful man." The parson was marched outside, shoved into a small outhouse and locked in. In the morning, it is said, he was found standing, frozen as stiff as a board.

It was not the clergy, however, which gave bundling its death blow. It was ridicule, and the weapon was a ballad published in an almanac in 1785.

The balladier described bundling with frank and unblushing realism. The title was mild with no indication of the dynamite to follow: "A New Bundling Song, or a reproof to those Young Country Women, who follow that reproachful practice and their mothers for upholding them therein."

Everybody knew that everybody else knew the poem, and hesitated to have its lines directed slyly at them. As a consequence, bundling went into a swift decline and by the turn of the century, 1800, had died out as a common custom. In some places it died hard, partly because the backwoodsmen didn't give a damn, and public pressure was not felt in isolated communities. Partly, of course, bundling hung on here because they had too few beds in their chilly houses. The practice was reported as late as 1804 in New York, and in 1827 on Cape Cod. In Pennsyvania, among the Dutch, it persisted until mid-century.

A curious twist of bundling turned up recently in the Pennsylvania law courts. A Pennsylvania matron sued for divorce on the grounds that her husband had used a centerboard in the bed for 14 years. This she endured, but when he compounded the insult by driving a row of spikes into the centerboard, she yanked him into court.

This must be one of the few centerboard beds extant today, for the line our ancestors drew was usually imaginary. This, of course, made of bundling an art for, as G. K. Chesterton said, "Art consists in drawing the line somewhere."

Hard-Headed FACTS Dictate All Common Sense Behlen Designs

SPECIAL REPORT

How to Put More Money in Your Pocket at Harvest Time

by ALEX DREIER & LLOYD BURLINGHAM

(Narrators of Common Sense Ideas on NBC Radio's Saturday Morning Monitor Program, "This Farming Business")

In years of farm newscasting, we've seen few truly superior products. Products, that is, that have all the hard-headed, Common Sense features found in Behlen Designs.

Here are the facts, as we investigated and found:

FACTS **GRAIN DRYER**

- The Behlen Batch-Type Grain Dryer will dry your grain as fast as any 2-row picker can pick it.
- The Behlen removes 623 gals. of water from a 500-bu. batch of 30% moisture corn in 2½ hours. That's 4.1 gallons every minute . . . *That's drying!*
- Behlen's powerful Axial-Vane Fan forces 78 cubic feet of this heat-charged, drying air (H/A Power) through every bushel *every minute.*
- Your Behlen can last you 10 times longer; because Behlen engineering moves the air . . . not the grain. This means your Behlen grain-moving equipment is in gear only 1/10th the time.
- Behlen Dryers (with 4 new improvements) are available in 250, 375, and 500-bushel capacities. They will all operate off your tractor's PTO or electricity or gasoline or L-P gas.

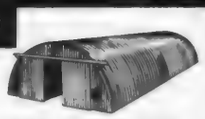
FACTS **CORN CRIB**

- The Behlen Corn Crib—with exclusive "Steep Pitch" roof design—gives you full use of otherwise wasted (but "paid-for-in-full") crib space above the eaves. This is because Behlen's Common Sense design follows the natural pitch of free-flowing grain.
- Extra-wide crib door lets you get your tractor's front-end unloader into the doorway for quick, easy unloading.
- All Behlen Corn Cribs are galvanized with a heavy zinc coating . . . *after welding.* There are no exposed weld spots where rust can start.
- Behlen All-Metal Steel Mesh Corn Cribs are available in sizes ranging from 611 to 1,940 bushels.
- And, Behlen Tunnels and Vents provide greater air circulation . . . safer grain storage. (Available in 10", 16" and 31" diameters.)

FACTS **GRAIN BINS**

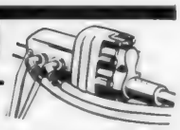
Exclusive "Steep Pitch" roof design is now used on all deep-corrugated Behlen Grain Bins. Non-aging rubber gaskets seal vermin and weather out . . . seal grain in. Exclusive double-seal door withstands pressure with no need for cross-ties, rods, or bars. Available in 950 to 3,590-bushel capacities.

FACTS **CURVET BUILDING**



New Frameless Metal Building—the Behlen Curvet—has unlimited farm uses. This low-cost building can be enlarged at any time by adding new panel sections. Self-framing 3-inch deep channel ridge panels form sturdy, rigid frame arches. Delivered in 40-foot widths . . . length unlimited.

FACTS **POWR-STEER**



It will pay you to attach a Behlen Powr-Steer to your tractor. Powr-Steer reduces fatigue . . . lets you operate your tractor longer and safer. Behlen Powr-Steer operates off your tractor's hydraulic system...fits practically every model. Takes only a few minutes to attach. Ask for a free demonstration.

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LOOK—A REAL McCULLOCH ONLY $149.95

At last, a professional-quality chain saw made for farm use — and for the farm budget! McCulloch's new Mac D30: Easy to carry! Easy to use! Built for hard work . . . toughest conditions. A tool you can depend on.

Mac D30 is the ideal farm saw for cutting sawlogs, pulpwood, and firewood, for clearing land, pruning, limbing or cutting fenceposts. Save money, make money, with a Mac D30 that cuts fast, lasts long — yet costs so little.

LIGHT WEIGHT — only 17 pounds, lightest McCulloch ever built.

DIRECT DRIVE — power for fast, easy "light-touch" cutting.

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ONLY $149.95—complete with 12″ blade and long-lasting smooth-cutting PINTAIL chain. Handles blades up to 30″. Terms as low as $3.69 weekly.

Your new Mac D30 is waiting for you at your local McCulloch dealer. Try it. Then buy it!

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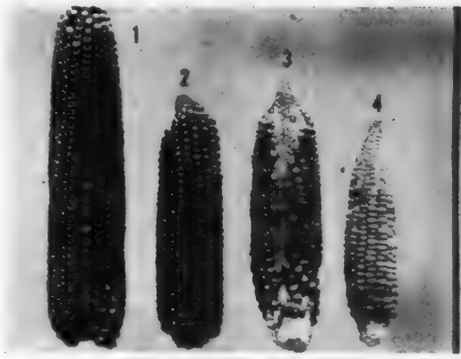
5-8020

How to Increase Your Farm Income in 1959

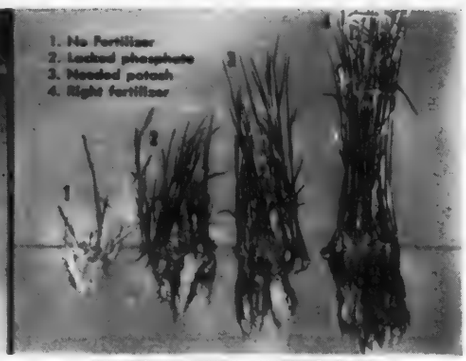


CORN, POTATOES, ROW CROPS

Lack of right fertilizer cuts profits, as above. Ear (1) was grown in balanced soil. Stunted, deformed ears came from depleted soil; (2) lacked nitrogen; (3) needed phosphate; (4) was potash starved, which also can cause stalk rot and lodging. Prevent such waste before it starts.

VEGETABLE AND FRUIT CROPS

Cucumbers at top were grown in soil fertilized according to the Sudbury Soil Test Kit; the 3 at bottom were harvested at same time from plants grown without following the tests. Get bigger crops, more fancy grade, ready for earlier harvest to catch highest market prices.



GRAINS, LEGUMES, PASTURE, MILK

Leading ag college increased wheat yield 10-fold with proper fertilizer. Note vigorous growth of No. 4. Even lacking only phosphate or potash the yield dropped 40%. Correct fertilizing means bulging granaries, fuller hay barns, fatter cattle, more milk, bigger bank balances.

Soil Building by Soil Testing Makes Farms Earn 3 to 5 Times As Much

GET up to five times as much net income per acre as the average farmer does. Give yourself the satisfaction of matching the Ohio farmer who doubled his wheat crop, tripled corn and hay, boosted oats 500%.

Higher yields per acre is the only way to make more money in farming. The Sudbury Soil Test Kit tells you how, and at the same time improves your land—builds greater security for you and your family for years to come.

You'll get back up to $15.00 or more in extra yield for every dollar of fertilizer your kit shows you need. It takes 45 to 50 bushels of corn per acre to meet your costs—so the more extra bushels you get by soil testing, the more money you make. Whatever you grow, just the first day's use will pay for your kit many times over.

Leading Farm Supply Stores—Hardware, Seed, Feed, Fertilizer, Implements, etc., have Sudbury Soil Test Kits. If your dealer does not yet have them, please use the Free Trial Order Blank at right.

Now you can do something about it, instead of just reading about such record yields as 200 bu. corn, 100 bu. wheat, 125 bu. oats, 5 tons hay, 900 bu. potatoes, 30 tons tomatoes, 300% increase in milk!

And Save Money on Fertilizer

You not only make more money, you save money too. You'll save up to $10.00 or more an acre on fertilizer. Guessing wastes both time and money—and using the wrong kinds or amounts can do more harm than good.

Profit from the experience of the farmer who guessed he needed to spend $500 for lime but soil tests showed he didn't. He saved the $500 and put it into phosphate really needed.

Easy As Reading A Thermometer

NO KNOWLEDGE OF CHEMISTRY NEEDED

Even your first tests will be accurate and reliable. Ready to use any time, anywhere, even right out in the fields. No waiting for reports—you get your answers right away. Takes only 10 minutes, costs less than 10c a test.

It's so interesting, so valuable you'll want to test every field right away—and you'll use your Sudbury Soil Test Kit all season long, year after year. FFA and 4-H sons and daughters quickly become experts. Some make extra money testing for neighbors.

The Sudbury Farmers' Lifetime Soil Test Kit

So reliable that vo-ag schools, ag colleges, extension workers, county agents, and progressive farmers everywhere depend on it. More valuable than your stock and tools! Complete with everything for hundreds of tests.

Shows right amounts of nitrogen, phosphate and potash for each field. Also whether lime is needed (pH) and how much. Lifetime welded steel chest with carrying handle, weighs only 12½ lbs. Easy instructions list needs for 225 different crops. **Same low price, only $29.95.**

BETTER CROPS GUARANTEE

YOU TAKE NO RISK—we are so certain you'll get bigger and better crops we'll refund the full purchase price any time within a year if you don't. That's our daring guarantee!

VALUABLE BOOK ON FARM MANAGEMENT FREE

If you send check or money order, in addition to saving you postal charges we'll also send, with our compliments, this valuable, illustrated book, "Our Land and Its Care."

Sudbury Laboratory, Box 66M, Sudbury, Mass., has supplied over 500,000 Sudbury Soil Test Kits. Sudbury is the world's largest maker.

Users of Sudbury Soil Test Kits Report:

FROM BELLEVUE, OHIO—Have made many tests. Found my soil very low in phosphorus. I feel it to be worth 1,000 times its cost on my 320-acre farm.

FROM EAGLESMERE, PA.—We have just bought a piece of land adjoining our farm and our tests will save us many times the cost of our kit. We felt it needed a lot of lime but found 2 tons to acre will bring it up so will spend our money on phosphorus and potash it seems short of.

FROM GREENVIEW, ILL.—Tested and used 250 lbs. 4-12-8 on corn and increased yield by 15 bu. per acre.

FROM JEFFERSON, IOWA—Soil Test Kit indicated phosphorus and potash deficiency. Never harvested more than 20 bu. beans in former years; this year 30 bu. per acre.

FROM PORT SANILAC, MICH.—Tests proved a potato field deficient in potash; nearly doubled usual yields. Discovered addition of phosphorus and potash essential, not nitrogen; saved on fertilizer cost. Discovered ground limestone had been applied to a plot where not needed.

FROM EL COMPO, TEXAS—A farm or ranch can be rich in lime and all three elements; a few hundred feet away the same black soil may be deficient in one or all. With this Soil Test Kit, if you want to buy a tract of land, test it and then buy or turn it down all in 30 minutes, and your kit is paid for many times.

FROM BERRIEN SPRINGS, MICH.—Our main crops are tree fruits. We found potash deficiency in some locations in the orchards. We have in the past sent soil samples but I guess we never sent enough. With the Soil Test Kit we can quickly come to a conclusion and act.

FROM HARRISVILLE, PA.—I can truthfully say it is the best buy I ever did make. It has paid for itself over and over again. I was using fertilizer too rich in nitrogen and not enough phosphate and potash. Last season I grew the finest corn I ever did grow and give my Soil Test Kit all the credit.

A survey among owners of Sudbury Soil Test Kits showed 30% found they had been using too much lime; 49% not using enough. 80% were sure they had better crops with the Sudbury tests. 40% said they had received tests from laboratories before buying their Sudbury Kits. 60% had no soil tests before doing it themselves.

DON'T DELAY—ORDER TODAY

Find out in just a few hours what fertilizer you need this year before you buy—and how to use correctly what you may have already bought.

SEND NO MONEY We'll mail C.O.D. $29.95 plus postal charges (or use easy-payment plan if desired—see coupon).

Or mail check with order and we'll send your Soil Test Kit prepaid, saving you $1.91 to $3.55 in postal charges.

FREE TRIAL ORDER BLANK

Use your Soil Test Kit for 10 days free — then if you don't agree it's one of your best buys ever, return it and we'll refund the entire purchase price you have paid. MONEY-BACK GUARANTEE!

SUDBURY, LABORATORY, Box 66M, Sudbury, Mass.

Send me the Farmers Sudbury Lifetime Soil Test Kit at the special low price marked below:

☐ Enclosed is $29.95; send postpaid; include free "Our Land and Its Care."

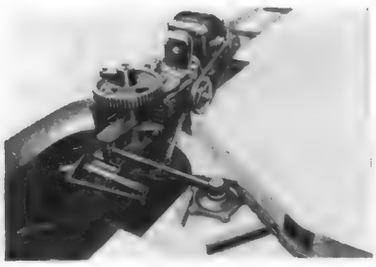
☐ Send C.O.D. only $29.95 plus postage.

Name .....

R.D. or St. .....

P.O. ..... Zone... State.....

☐ Send on Easy-Payment Plan—I'll pay mailman $4.95 plus postage, then 4 monthly payments of $6.75 each.



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BARN CLEANER

LASTS LONGER

Two-unit design is the reason

Gutter chain operates on same level at all times. Eliminates uphill pull or strain on main drive unit. Chain does not twist, bend, tilt into unnatural positions. Means less chain strain — longer life.

Litter is transferred from gutter to elevator hopper. Elevator paddles operating only on elevator, sweep through hopper at 55 ft. per minute. Fast enough to get both solids and liquids without run-back.

For complete information mail this coupon.

The Louden MACHINERY COMPANY

3212 South Court St., Fairfield, Iowa
Branch: Albany, N. Y.

Please send me complete information on the Louden Two-unit transfer-type barn cleaner.

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Address

City State

NEW TOKHEIM GASOLINE PUMP

Gasoline savings begin in your storage center! Tokheim Model 48 Pump, with an underground tank, brings *big savings from quantity purchases*—less fuel loss! Much safer than above-ground storage, too. UL approved. Delivers 10 gal. per minute—has easy-to-read dial, plenty of hose. See your oil company, or your Tokheim representative.

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TOWARD PUSH-BUTTON STOCK RAISING

(Continued from page 67)

both of them on different projects.

"If we decide to simplify," Fletcher continued, "we must make a careful study to eliminate every possible handling of materials. This method involves letting the animals do as much harvesting as possible; or feeding them from the storage site without handling the feed stuff twice. Feeding from bunker silos and hay storage buildings are good examples of simplification. Building design and placement are the important factors in a simplified system, more so than the use of machinery or other equipment."

Simplification works best for roughage feeding. Heavy roughages are difficult to move automatically without pelleting or other processing. A simplified system gives more flexibility as far as changing enterprises is concerned. For example, one farmer successfully converted his bunker silo from a self-feeder for beef cattle to grain storage for poultry.

If the decision is to simplify, remember the operator is the key man. A good man can make simplification compete very closely with a highly automated system; a poor operator will show very little improvement over any average stock farm. The ability of the farmer won't make such a difference with a well-planned, automated system.

"The decision to automate a feeding operation shouldn't be made lightly," Bill Fletcher warns. "Farmers who are afraid of machinery or who can't get the feel of such a system would be better off to forget automation. But you don't have to be a mechanical wizard by any means. Remember what a time some farmers had converting from horse to tractor farming? It was awkward for them at first, but a little familiarity solved most of their problems. But those who never did get the hang of a tractor shouldn't take the path of automation."

It is often necessary to simplify the farming operation itself. A general livestock farm is tough to automate. There are too many different operations; too many different kinds of feed; too many places on the farm where the feed must be delivered. Therefore, many farmers who decide to automate specialize on one class of stock. Sometimes, as with Robert Yordy, who farms near Peoria, Illinois, automation was introduced with a new farm project.

Yordy planned a beef feeding operation to fit both his feed production and his farm layout. With the over-all plan in mind, he selected a hill unsuitable for crop land and leveled a spot large enough for his shelter barn, feed lot, trench silo, upright silo, and grain bin. His main feed, corn silage, is stored in a 4,000-ton, concrete-floored trench silo. Wet corn is stored in a self-unloading, air-tight silo, and supplement in a hopper-bottomed bin. His farmhand fills a self-unloading wagon with silage

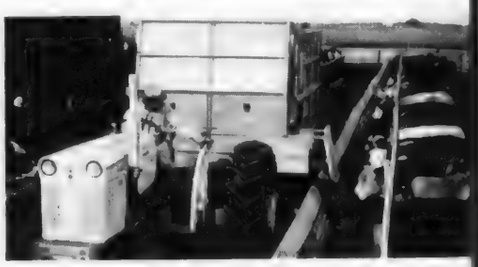
CASE

NEW! **Auger Unloader and Mixer-Blender**

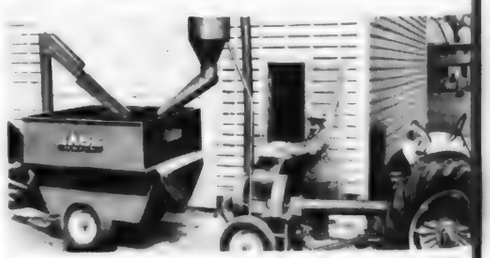
NEW! **Power Unloading Wagon with Bunk Feeder**

to mechanize your feeding jobs

New Case-Helix mixer-blender and auger unloader mixes feed to commercial standards, automatically unloads up to 6,000 pounds of feed in one trip. Available in 90 or 125-bushel sizes.



New Case-Helix power unloading wagon with bunk feeder has exclusive self-cleaning Convey-o-matic floor that prevents clogging. Add-on design permits buying basic grain box, building up to complete automatic wagon.



Case "Feed Saver" hammer mill in 10 or 14-inch size is ideally matched to Case-Helix mixer-blender to provide your own barnlot "feed factory" for fast, low-cost grinding and mixing of home-grown feeds.

FREE

Watch for your local Case dealer's Materials-Handling Clinic!

announces 4 great new materials-handling machines

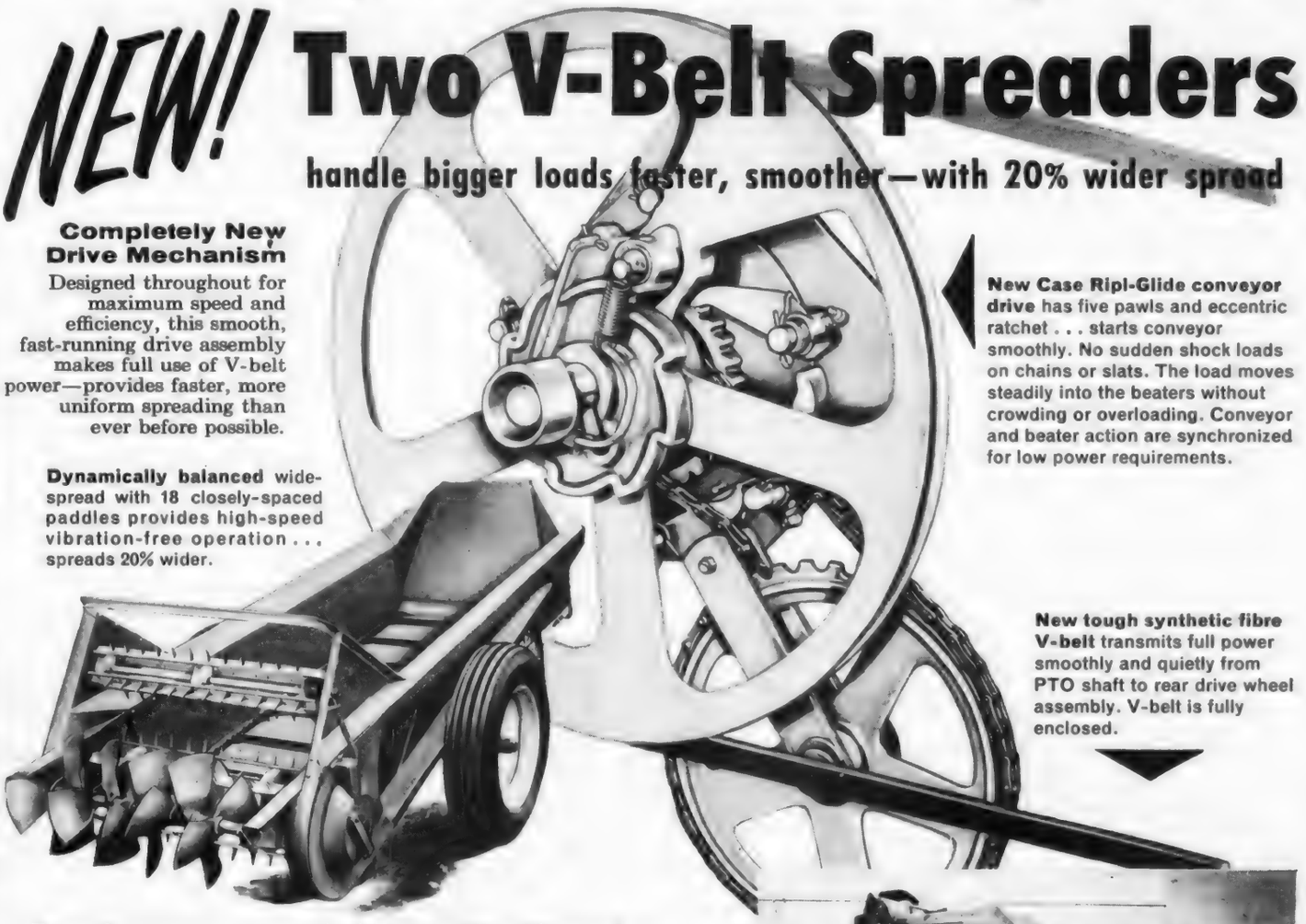
NEW! Two V-Belt Spreaders

handle bigger loads faster, smoother—with 20% wider spread

Completely New Drive Mechanism

Designed throughout for maximum speed and efficiency, this smooth, fast-running drive assembly makes full use of V-belt power—provides faster, more uniform spreading than ever before possible.

Dynamically balanced wide-spread with 18 closely-spaced paddles provides high-speed vibration-free operation . . . spreads 20% wider.



New Case Ripl-Glide conveyor drive has five pawls and eccentric ratchet . . . starts conveyor smoothly. No sudden shock loads on chains or slats. The load moves steadily into the beaters without crowding or overloading. Conveyor and beater action are synchronized for low power requirements.

New tough synthetic fibre V-belt transmits full power smoothly and quietly from PTO shaft to rear drive wheel assembly. V-belt is fully enclosed.

From the moment you see the big 18-paddle widespread on the new Case 115 or 135-bushel V-belt spreader, you expect something new in performance. When you start down the field, listen! You can hardly hear the fast-moving mechanism, yet you're spreading a 20% wider blanket of manure. And just look at that fine, even shredding . . . no chunks, anywhere! It's fast, too . . . before you know it, these new big-box spreaders have you back to the barn for another load. Look at those 120 staggered, self-cleaning beater teeth . . . notice the tough, non-warping plywood box, built for extra years of service. Now look under the spreader . . . two channel-steel beams stiffen its rugged V-hitch frame. See today's *newest* spreaders . . . choose from the longest spreader line in the industry (135, 115, 125, 105, 95 and 75-bushel models). Call your Case dealer today—set a date for a demonstration right on your farm.

New Case 190 front-end loader, shown on new Case-o-matic Drive 400 tractor, has compact industrial design for extra strength . . . big 3,000-pound break-out power . . . 10½ cubic-foot capacity. Operates from 6 inches below ground level to height of 9 feet. Available with manure fork, dirt and snow buckets.

CUTTER-SCRAPER WITH EVERY DEMONSTRATION

Case Crop-Way Purchase Plan puts any of these cost-cutting materials-handling machines to work on your farm now—you pay as you have money coming in. Ask your Case dealer for details.

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- ☐ V-belt spreaders
- ☐ Materials-Handling Short-cuts
- ☐ Feed and forage-handling machines

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Address_____

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BUTLER
"COMMERCIAL SIZE"
GRAIN BINS

...big farm storage in a hurry at low cost per bushel

Now you can store your grain on your farm at a cost so low it equals the most efficient elevator storage—including flat storage structures! New Butler "Commercial Size" Grain Bins bring an entirely new dimension to on-farm grain storage. Low per-bushel cost makes it more attractive than ever before to store your grain for post-harvest price rises or government loan.

These "Commercial Size" Butler Bins are the perfect answer to bumper crops, too. They can be erected in days to handle above average yields safely, efficiently. Push-button loading and unloading can be installed at low cost to save labor and speed up grain handling. Butler's galvanized steel construction needs little maintenance. Capacities from 3600 to 15,000 bushels provide a wide selection of sizes to meet individual storage requirements and handle all your crops.

Let the lack of adequate commercial storage space work to your advantage next year. Plan on-farm storage now—with Butler "Commercial Size" Bins. Write for full details. For prompt reply, address the office nearest you.

FOR HIGH-MOISTURE CROPS

Butler Stor-N-Dry System gives you storage and drying all in one unit—saves extra handling—saves cost of separate dryer. The Stor-N-Dry System consists of a Butler bin, perforated floor, fan and heater. Systems are available to fit every crop and moisture condition. Capacities range from 1000 to 40,000 bushels.

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from the trench using a front loader on a small crawler. Other feed ingredients are augered onto the load from the hopper bin and the upright silo, and the feed is mixed and fed into a fence-line feed bunk. Manure is bulldozed off the concrete slab by the same crawler tractor and silage loader. The manure is shoved over the edge of the hill until several hundred loads have accumulated, then it is spread on the fields as a crew operation. "With this set-up," Fletcher said, "one man handles 500 head of steers with time left over. We used to figure 150 head was all he could manage."

Yordy's feeding plan is simple compared to a system mixing feeds with many ingredients. By breaking down the feed handling process to its basic steps, however, machines can be used. F. W. Andrew, University of Illinois engineer, classifies the equipment into storage, metering, grinding, conveying and distributing.

A storage bin may be a crop drying and conditioning unit as well as part of the feeding system. Metering or blending equipment is the second part of the integrated feeding system. Augers and vibrators are both sufficiently accurate for almost all livestock rations. Belts and mats may be required for materials which do not flow easily, such as hay. A feed which contains molasses will sometimes defy every known mechanical method of moving, blending or grinding, unless temperature and humidity can be controlled. Automated burr mills, knife mills, rollers and hammermills are available.

Storage, blending and grinding units should be built near the point of use. Unfortunately, the buildings on many farmsteads are not so placed. An elevator is the most efficient conveyor from a horsepower standpoint. An auger conveyor is next in line and a blower is least efficient. But efficiency is not the only factor. Each type has its advantages for a particular installation.

The distributor is the final step in the feeding operation. The trend is away from self-feeding units. The newer approach is the system which operates automatically, distributing feed into troughs or bunks and feeding at frequent intervals. Here both augers and reciprocating conveyors can be used. It is important to be sure the distributing equipment matches the grinding and conveying equipment and will handle the feed delivered.

This problem of adapting a system to buildings and farm layout is often so great it is sometimes better simply to forget the old barns and start fresh. Bill Fletcher ran into such a situation when he was called in to help plan a more efficient operation for the Sinnissippi Dairy Farm at Oregon, Illinois.

"The Sinnissippi problem was a tough one. With an 80-cow herd of high producing Holsteins the farm was in trouble. The production records on these registered cows averaged over 13,000 pounds of milk and 415 pounds of butterfat, but they were losing money. In analyzing the problem we found their labor costs were very high and so were veterinary fees.

"After studying the old stanchion barn set-up with its awkward hay storage facilities we finally decided to move the dairy operation to another part of the farm and start over. We put in a loose housing system where both silage and hay could be self-fed out of the storage facilities. The hay barn was equipped with a mow-dryer so hay could be dried and fed in the building. The milking is now done in a four-stall milking parlor with pipe line and bulk tank cooling. Two men do the job which used to take four. Production per cow has remained the same and the size of the herd has been increased slightly."

Many dairymen will wonder if abandoning the old buildings on the Sinnissippi farm was a practical move. "When we began planning the job," Fletcher said, "Sinnissippi had an annual loss of $3,038.33. In 1956 we only had three months of operation on the new arrangement, but we showed that we could cut labor in half and increase the number of cows milked.

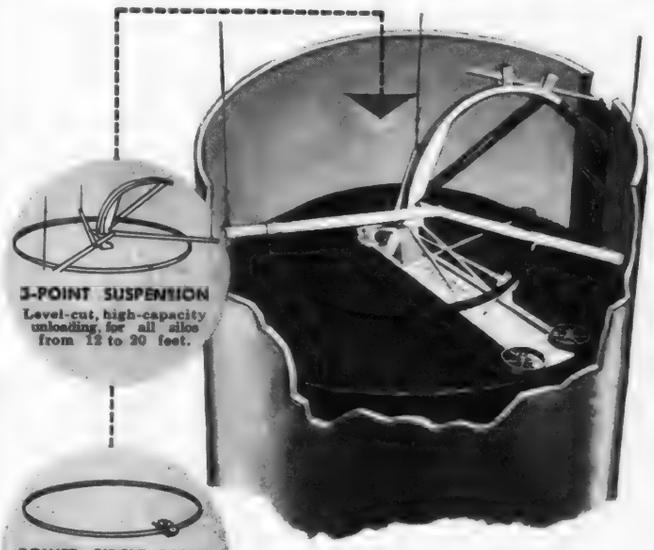
"In 1957, the first full year of the new system, the dairy operation on this farm netted a profit of $3,405. This was after paying for management, depreciation on the $56,000 buildings and equipment, interest and all other conceivable costs. Our savings were mainly in labor though the veterinary bills were also substantially cut because of loose housing. The building arrangement reduced harvesting costs. The dryer improved hay quality."

One farm's success with automation doesn't necessarily mean

Level cut <u>every</u> round

JAMESWAY VOLUMATIC SILO UNLOADER

precision stability through 3-point suspension


3-POINT SUSPENSION
Level-cut, high-capacity unloading for all silos from 12 to 20 feet.
POWER CIRCLE DRIVE
Rugged sprocket meshing with gear ring provide 100% positive silage delivery every second. Single motor doesn't depend on silage surface for traction.
QUICK TAKE-DOWN
Jamesway ends tough, time-consuming labor. Two men with 2 wrenches knock down, move, reassemble this unloader in less than a half day.
TOP UNLOAD HIGH-MOISTURE CORN
low cost — high volume
Jamesway Volumatic slices through wet corn evenly — no fluffed surface to dry out or spoil — chutes it direct to feed bins or bunks.

Power Circle Drive assures full capacity on every cut

ONE-DOLLAR-A-DAY TAKES BACKACHES AWAY! Just a small down payment and $1-a-day delivers a Jamesway Volumatic Unloader to your door . . . with the top-flight engineering that gives Jamesway a *bigger performance edge.* Three-point suspension guarantees plumb-line-straight hang — cuts level-true through toughest silage, grass or corn. Teamed with Power Circle Drive, auger doesn't "sink" in the soft spots — slices razor-sure through hard packed or frozen silage. Jumbo fan tumbles, aerates, fluffs fresh-cut silage into an extra-palatable, high-production feed cattle really take to. Yet just a single motor powers the entire unit. Whether your silo is 12 feet or twenty, Jamesway Volumatic adapts easily to a wall-cleaning precision fit.

See your Jamesway dealer for the low-cost, high-capacity, quick delivery Volumatic silo story or write JAMES MFG. CO., Dept. FQ-128, c/o your nearest division office listed below.

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FOR POULTRY • FOR DAIRY • FOR LIVESTOCK

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OF PIONEERING PROGRESS
Give Your '59 Profits a Big Lift!

BURCH
FAST-ACTION
HYDRAULIC LOADER

- Control valve with easy-to-reach levers . . . accurately controlled under all conditions
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- Low silhouette design assures unobstructed front-end visibility
- Quick, easy mounting . . . removable in minutes
- Furnished with single or twin bucket rams . . . hardened CHROME FINISH on precision-ground shafts

Here's one of the huskiest, handiest loaders — with year-round time and cost saving uses on any farm! Welded box-type construction throughout, including front frame with heavy-duty bumper. Furnished with 40" standard or 60" utility all-steel bucket; lift capacity up to 2500 pounds. Rugged, reliable — real "True Blue" value!

BURCH WHEEL-TYPE OFFSET DISC HARROW

Another great product of Burch specialized experience, field-proved to be unmatched for discing performance! Gangs fully adjustable. Easily offset right or left with adjustable hitch. Heavy-duty white iron or ball bearings — interchangeable. Available with 22" or 24" round or cut-out blades.

AMERICA'S MOST COMPLETE LINE OF
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it is the answer for all livestock feeders. Yet, there are figures which seem to show most farms could profit by a move toward push-button farming. Using a survey of 320 Michigan farms, two agricultural engineers, R. W. Kleis and D. C. Wiant, figured the labor reduction due to investment in materials handling equipment. They found the average investment in materials handling equipment on these farms was slightly over $2,000 and that each increase of $2,000 would drop labor requirements about 20 per cent. This ratio of investment to labor saving is true to $10,000 when diminishing returns begin.

For the farmer who is considering the move toward farmstead engineering, the most valuable sources of information will be the trained men who advise on this subject professionally, extension specialists from the colleges, manufacturers of materials handling equipment, engineers employed by electric power companies, and, most important of all, other farmers who have taken the step themselves. Visiting some of the automated farms will give a hatful of ideas and a knowledge of some of the pitfalls. It will also show that we are now capable of doubling and tripling our livestock work output just as we have field work.

THE AUTHOR: Wayne Ritchie is Assistant Manager of the Publications Division of Doane Agricultural Service. He graduated from the University of Illinois.

SHOULD I BUY LAND?

(*Continued from page* 43)

year-to-year basis times the announced corn price support in the same year gives an answer which closely parallels the trend of land values.

These examples all prove the same point—farmers are pricing land in relation to changes in the value of the dollar and in relation to improving technology.

Competition among adjoining farm owners is a very real part of the scramble for land. For example: When the Donald Smith estate in central Illinois was put up for sale recently it was divided three ways. Two adjoining farmers took over Kenneth Black's farm near Valparaiso, Indiana, when a new highway went through and Black decided to sell out completely.

The steam behind this competition is very real and of growing importance. It is generated by government allotments and new power equipment. Big equipment demands a large acreage. A self-propelled, 2-row cotton picker is almost useless in a small cotton patch along a bayou in Mississippi. But give it room, as out in the western irrigation country, and it pays off and revolutionizes cotton production.

Government allotment programs have tended to freeze crop production in the old areas and at the same time limit planting per farm. In this respect at least, government controls have stood in the way of a more rapid adoption of new equipment. Farmers have had to choose between buying more land, thus to gain control of a larger allotment, or giving up some of the advantages of improved machines. In the long run the second alternative was self-defeating and farmers were quick to recognize the fact. They are buying land to gain the advantages of new machines.

This advantage can be capitalized into some substantial land values. Professor C. L. Stewart, land economist at the University of Illinois, says, "If all cost reductions resulting from adding 80 acres to a 180-acre farm in northern Illinois were credited to the added 80, it would amount to about $18 per acre per year. Assuming that farming is profitable in most years, with only an occasional loss, this reduction in costs adds $450 an acre to the value of the land for the investor who figures his money worth 4 per cent." Dr. Stewart's statement is based on his analysis of cost account farm records in Illinois.

"In many cases," as Dr. Virgil L. Hurlburt, associate professor of economics at Iowa State, observes, " as much as 80 acres can be added to existing farm units without increasing overhead costs, particularly for machinery." This gives the established farmer a decided advantage in competing for purchase of a small tract of land.

What's It Worth?

Anyone faced with the opportunity to buy more land can appraise the value of that land to him through the following three steps:

3 ACES...to BOOST YOUR EFFICIENCY in the FEED LOT

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The new Feed-O-Mixer, latest Snow Company advance, is GUARANTEED to mix perfectly and uniformly all grain, ground grain, and prepared feeds.

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Featuring advanced design, construction and performance, the Feed-O-Mixer has a 16 gauge galvanized steel box and precision made augers for a long life of trouble-free service. Operates off any farm tractor PTO.

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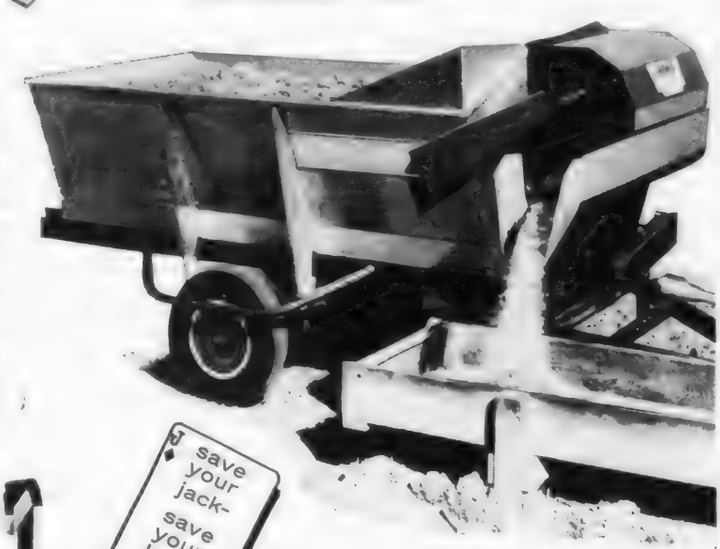

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Unloads, elevates all grain and ground feeds—handles 20 bushels or more per minute. Heavy galvanized all steel box has 85 bushel capacity; 118 bushels with optional extension sides. Front or rear delivery; elevating auger discharges to either side.

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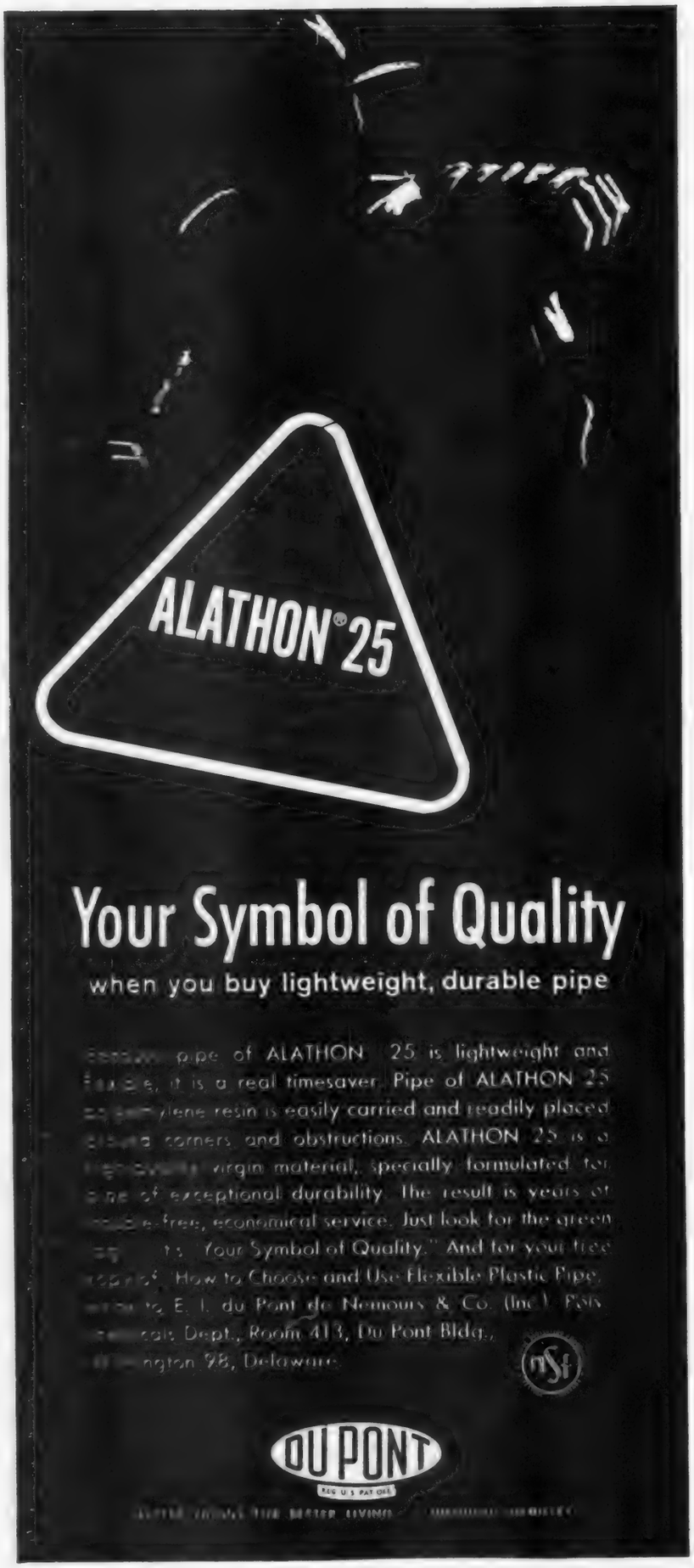

(1) From your farm records, figure how much income you get from crops—strike an average of 3 to 5 years. Divide this figure by the number of acres in your farm to get average per acre returns. Crops fed should be charged to the livestock enterprise at market value but do not include livestock receipts in this estimate of income (livestock returns include income from too many sources other than the land itself). To illustrate, say you have a 180-acre farm and that the value of all crops produced comes to $11,700 per year. Your average return is $65 per acre ($11,700 ÷ 180 acres = $65).

(2) Next, and from the same records, calculate the variable costs of growing and marketing the crop. Forget such fixed costs as family labor, machinery depreciation and other expenses which go on about the same whether you farm on the same or a larger scale. Do include taxes, tractor fuel, machinery repairs, fertilizer, seeds and the like. For our illustration, assume these figures work out to a total of $3,510 or $19 per acre, ($3,510 ÷ 180 acres = $19). Add to this figure the annual cost of owning the land. If you value your farm at $350 per acre and use a 5% interest rate, this charge comes to $17.50 per acre ($350 x 5% = $17.50). The total cost adds up to $36.50 per acre per year ($19 + $17.50 = $36.50).

(3) Finally, to find out what you can afford to pay for additional land, similar to that you now own, subtract variable costs from income and divide by the interest rate used in figuring the carrying charge. Thus in this example, $65 income minus $36.50 expense equals $28.50. At 5% this figure represents the return on an investment of $570 ($28.50 ÷ 5% = $570). This is the most you could pay for additional land without penalizing the rest of the farm. If you are willing to take a lower return on your money, you can pay more. If you demand a higher return then you must buy for less.

The procedure outlined above spells out the methods and reveals something of the capital structure leverage which established farmers can use to buy additional land. The beginning farmer can claim no such ad-

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vantage. Thus he comes into the market under a big handicap. In arriving at what he can afford to pay, it is necessary for him to look at the entire farm operation.

To illustrate, suppose that he is considering buying the original 180 acres in our illustration. Fixed costs of owning machinery and buildings must be considered. Operator and family labor must be paid. However, livestock should not enter into the figures except as they provide a market for farm products.

Assume that he pays himself a labor-management wage of $5,000 per year and that his other fixed expenses of owning and operating the farm come to $1,000. His total fixed operating expenses are $6,000 which, when added to his variable costs of $3,510 (from the above example), come to $9,510 ($6,000 + $3,510 = $9,510).

Thus as owner-operator of the home unit he has a net return to capital of $2,190 after allowing himself $5,000 for running the business ($11,700 income — $9,510 = $2,190). This represents a return on $43,800 or $243 per acre at 5%. ($2,190 ÷ 5% = $43,800). In plain English this means that he must pay something like $107 per acre over his anticipated earnings value just to become established on this farm of 180 acres (assuming the going price is $350 per acre).

The difference between the $243 earnings value and the $350 market value is a conservative difference. It represents the market-place evaluation of schools, roads and other factors that make the farm a place to live as well as a place to earn a living.

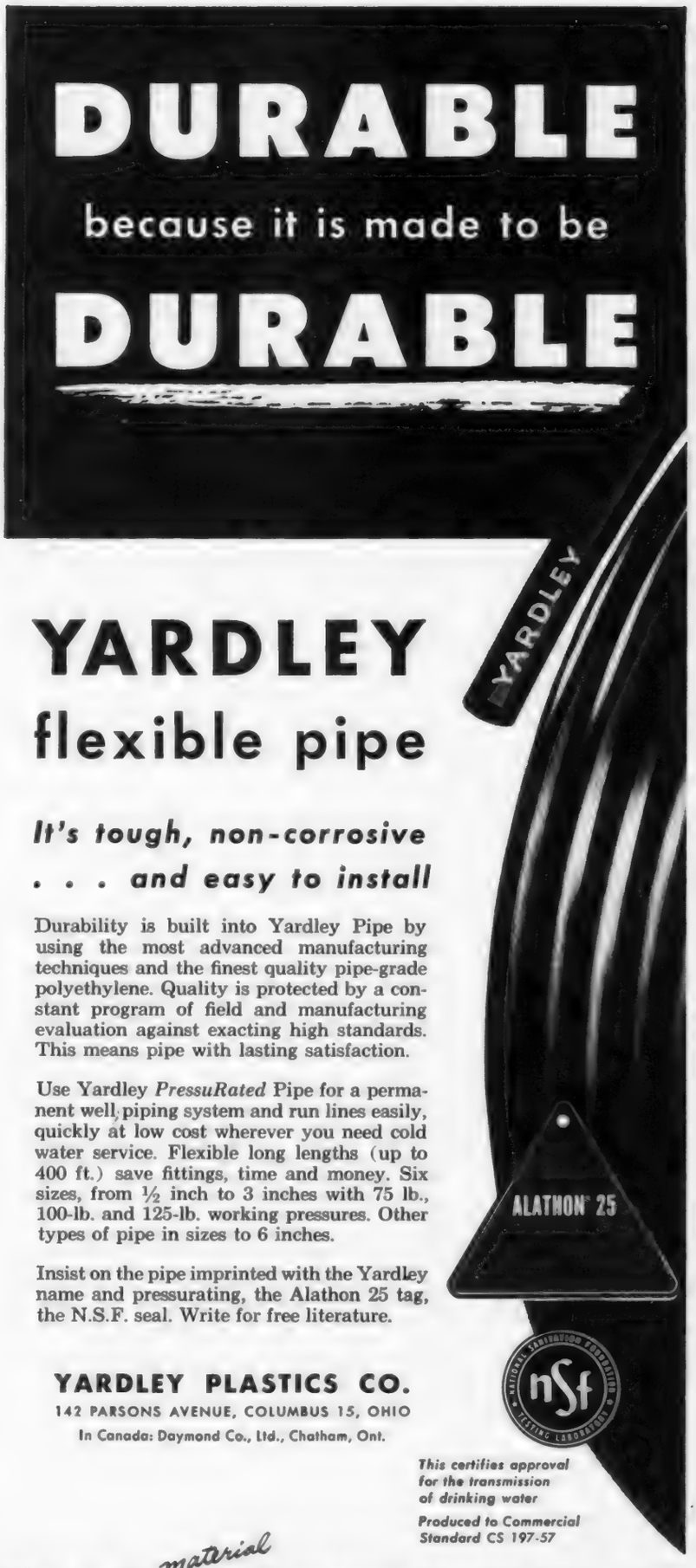
From a competitive point of view, however, the earnings differential is no less real. The prospective new owner is at a substantial disadvantage. The established farmer can use all of his economic leverage in obtaining a desirable piece of land if he must.

This factor points up the very real problem of many would-be farmers. To obtain an economic unit, the new farmer must come in under a grave handicap if he is short of capital.

For this reason it is to the advantage of the beginner to lease a large farm rather than buy a small one. When every dollar is needed for working capital there is just no choice—if you can't rent, you can't farm.

There comes a day, however, when every young farmer who has been successful as a tenant faces the decision of whether or not to continue renting. The proposition may be presented in many different ways. The right answer as to whether or not to buy will depend on the man's age, the amount of money he has saved, and many other factors.

Perhaps the life story of Frank Rice, a Marshall County, Iowa, farmer will explain this point. Frank was born in 1900. He started farming in 1920, and married Anne Long in 1921. They were thinking seriously about buying a farm when the crops were harvested that fall, but that was the year commodity prices broke. Frank and Anne thanked their lucky stars that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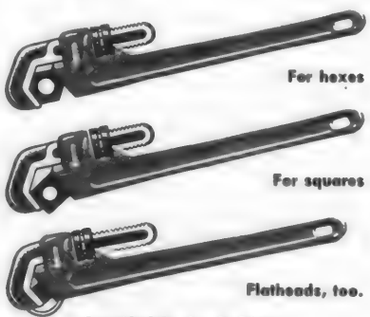

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they had waited. Frank Jr. arrived in 1923, Tommy came in 1925, and the twins in 1928.

Frank and Anne had their hands full, but they had just about screwed up their courage to the point of buying a farm when the crash of 1929 caught them by surprise. Their good luck was still holding. In 1933 Frank rented a bigger place and, with some persuasion, accepted a 5-year lease. This was no time to buy a farm, but the insurance company wanted to be sure it had a renter. The drouth in 1934 and 1936 could not have come at a worse time. The Rices had been farming for 15 years now, but had little more than their machinery, their livestock, and the children to show for it.

The depression of the winter of 1937-38 came right at the end of the first lease period. Frank was given the option of signing another 5-year lease or buying the farm. The insurance company said that he could have the contract for $40,000 with no money down. They would let him pay off the contract like rent. As Frank saw it, this simply meant that he was assuming a pretty big debt and the taxes for the farm. The outlook was not good, so he decided to wait. In 1940 the insurance company was successful in selling the farm to a businessman.

Mr. J. W. Rose, the new landlord, was happy with the job that Frank was doing, and the Rices liked the freedom that "J.W." gave them. Came Pearl Harbor, and Frank Jr. was one of the first to go. The future was even more uncertain, and in 1943 Frank was glad to sign another 5-year lease. He was making money now, and his bank account had grown to $25,000 by 1945; three years later it had jumped to $40,000.

In 1947 Mr. Rose passed away and when the lease expired in 1948, the heirs asked if Frank would like to buy the farm. His $40,000 would make the down payment, and there was an insurance company that would loan another $40,000. But Frank remembered that in 1938 he could have bought the same farm with nothing down, and a debt of $40,000. He just couldn't see putting up the savings of ten years and assuming a debt every bit as big in dollars as in 1938. Besides, he remembered 1921 and 1929, and 1933, and 1934, and 1936.

The farm sold to a neighbor, and in the spring of 1949, after 15 years on the same place, Frank and Anne had to move. Until now Frank had never given his age a thought, but those 49 winters made it hard for him to find a farm. For a time it looked almost like they would have to buy, but luck was in their favor and they got a good farm that had been neglected. The house was run down, but even the twins were married now, so Grandmother could put up with it. And, given a few years, Grandpa Rice could lick the weeds.

Lots of money came in, but it was hard to hold because everything kept going up in price. When I talked with Frank recently, I found that he is again faced with the same old decision. It seems that a son of one of the heirs who own this place has decided that he wants to farm. Because

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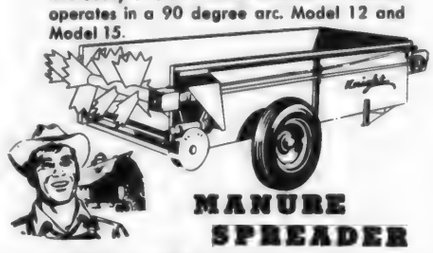

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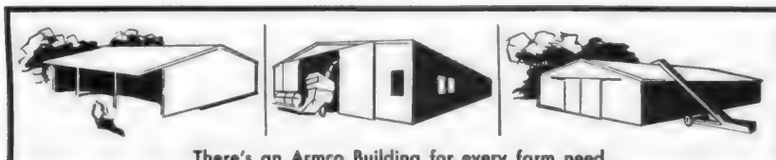

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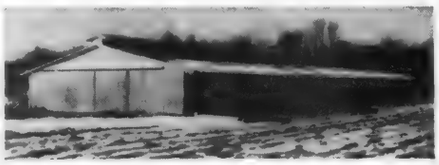

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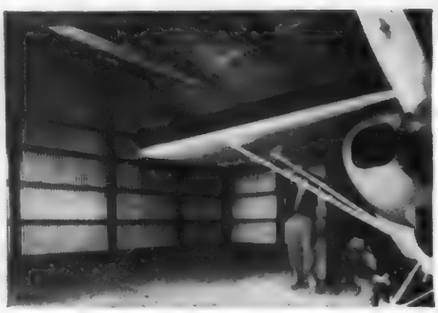

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Frank Rice is now up in years, the family has decided to let young Martin take over. Farming is a young man's game, they say, and every young man needs a chance.

Frank Rice has saved $2,000 every year since 1948. His bank account totals just over $60,000. That's a pretty big pile, and as a tenant he has been successful. But his productive life is spent. The $60,000 will still buy only half a farm, and he can't live on the rent from that. Social security will help, but Frank is worried. Out of a lifetime of experience he has this advice for the young farmers of today: "Tell them," he said, "not to rent any longer than they have to. As soon as they get their eqiupment paid for, it is time to begin buying land. If they can't buy a whole farm, buy an 80.

"The same advantage in buying goes to the operating tenant that goes to the owner. He can spread his machinery investment over more and more acres. If only someone had shown me what was happening back 20 years ago, I would be in a lot better shape today. Every dollar I saved during the war years has shrunk until it is worth only about 50 cents. If I had bought out the heirs in 1948, I'd be worth at least $100,000 today, and I would almost bet you that I could have paid off the entire mortgage in those 10 years. It's frustrating to think what it would have meant to me and my family if I had bought the farm when the insurance company wanted to sell it in 1938."

So, what should you do if you have the choice between buying or leasing? There is no pat answer. Your own good judgment must be your guide. However, there is only one time in life to buy a farm, and that is when you are ready for it. How do you know? Perhaps this 4-step guide will be helpful:

(1) For the young man under 35—do not hesitate to use all the credit that reliable agencies will lend. Use it first to buy operating equipment and livestock. When these are paid for, begin buying land.

(2) For the man 35 to 45—your machinery and livestock should be owned outright by now, but you can take on a loan equal to 50-70% of the purchase price of land. The safe percentage drops about 2% per year as you grow older.

(3) For the man 45 to 55—your health is your biggest asset other than equipment and livestock. Keep the mortgage under 50% of purchase price and remember the 2% per year rule. By age 55 it is dangerous to assume a mortgage of more than ⅓ the purchase price.

(4) Above 55—do not assume major mortgages unless you are assured that someone is available who can take over the operation of the farm and run it for you if the doctor should say "you have to take it a little easy now."

Based on this analysis of land values our thinking can be summarized in these terms:

Buy good land as it becomes available. Never let it go except to exchange it for other land more favorably located. With

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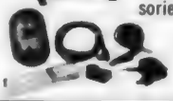

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Imperial Valley Pump & Supply
Fred Miller
Lockeford, Geehring Hardware & Supplies
Longvale, Alexander Bros.
Madera, J. L. Williams
Monterey Park, Neff Pump Service
North Sacramento, Odell's Pump Service
Simi, Burr Pump Co.
Ontario, Neil A. McMullin
Palm City, Union Pump & Equipment Co.
Palo Alto, Robert Garcia Well Drilling
Porterville, O. S. Jackson Pump Service
Ramona, Ray West
Santa Ana, McCall's Bros. Pump & Drilling Co.
Santa Rosa, Bartley Pump Co.
Victorville, Water Service & Equipment Co
Vista, Western Drilling & Pump Co.
Wasco, Carter Machine Shop
Woodlake, W. R. Godfrey Pump Co.
Woodland, William P. Wilson
Yuba City, Schmidt Pump House, Inc.
FLORIDA
Tallahassee, Barnes Pump & Well Drilling
GEORGIA
Jesup, Harris Gin Co.
Statesboro, M. E. Olin Co.
Thomasville, Davis Motor Repair & Supply
ILLINOIS
Elsa, Noonet Water Well Service
KANSAS
Garden City, Humble & Co.
LOUISIANA
Bayou, Guidry's Machinery Co.
Shreveport, Peerless Supply Co.
MICHIGAN
Scottville, Pump Engineering & Supply
MINNESOTA
Minneapolis, Twohs Equipment Co.
MISSOURI
Kansas City, Ferguson Pump & Machinery
MONTANA
Billings, Midland Equipment Co.
NEVADA
Ryer, Wright Drilling
NEW HAMPSHIRE
Keene, Brandt Pump & Supply Co.
NEW JERSEY
Bridgeboro, Charles Hellstat
Lodi, Mooney Bros. Corp.
Sea Girt, Joseph T. Kearns
NEW MEXICO
Albuquerque, Powell Electric Corp.
Clovis, Hagen Bros. Pump Co.
NEW MEXICO
Deming, Oliver Implement Co.
Las Cruces, Joe L. Smith Implement Co.
NEW YORK
Bethpage, L.I., C. W. Lawson
Mt. Ivy, M. W. Ives & Son
NORTH CAROLINA
Raleigh, Heater Well Co., Inc.
OKLAHOMA
Oklahoma City, Oklahoma Pump & Supply Co.
OREGON
Klamath Falls, Valley Pump & Equipment Co.
Portland, Pump Pipe & Power Co.
RHODE ISLAND
West Barrington, James H. Boyd
TENNESSEE
Jackson, Southern Supply Co.
Nashville, C. W. Lovell, Inc.
TEXAS
Colorado City, O. L. Williams
Crystal City, Zavala Pump & Supply Co.
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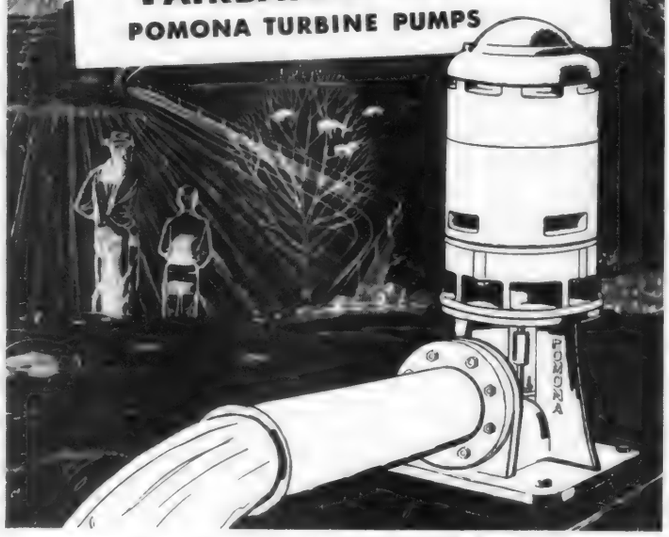

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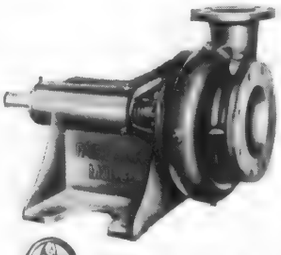

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farming organized as it is today there is no necessity to refinance the farm to pass it on to the next generation. Investigate the possibility of incorporation to keep the unit intact.

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The evidence weighs heavily in favor of a continuation or even a more rapid depreciation in the value of our money.

That our paper money is of insecure and fluctuating value is clearly proclaimed by the interest rate manipulations of the Federal Reserve System. The value of our money depends on the attitude and desires of politicians and others with delegated authority. Good land, well managed, is of enduring value. Its worth transcends time. From generation to generation, from civilization to civilization, good land remains to provide the very dust of which we are made.

THE AUTHOR: Earl F. Crouse is president of the Farm Business Council, Inc., an organization he recently established after many years as vice-president of Doane Agricultural Service. There he headed up all publications and economic research.

PRODUCTION PER STALL

(*Continued from page* 51)

do not do well in loose housing. So every Hackett farm which boasts a loafing barn has a stanchion barn to go with it.

On such farms two distinct herds are maintained, one in each barn. Each herd has its own pastures and each barn has a separate milking parlor or milk room.

Wages and Hours

Hackett's tenants are all on a cash wage basis. He owns the farms, the cows and all the equipment and furnishes all the feed, which he expects to be used liberally. His milkers get a salary of $60 per week, plus house, electric and fuel, and two weeks vacation with pay.

Each milker is assigned a production quota of a ton of milk a day from the 60-odd cows he has assigned to him. "If he falls below that quota I start looking for another man," says Hackett. But for every 100 pounds a day he betters it the milker gets a bonus of $15 a month. More of the herds are turning in an average of 3000 pounds per day than are barely making the quota.

Field hands, of whom there are 7 to 14 varying with the season and the work, get around $50 per week.

All of the milkers are married. "I wouldn't hire a single man to do chores," Hackett says. "I want a man who is settled down and is strictly business. Most of our men start getting their cows in at 4 in the morning. I want them to take a three-hour nap in the middle of the day so they will be on their toes for the afternoon milking. It's just like a baseball player. He tends to his job and relaxes between times. If he spends his spare time galavantin' around he's not going to be a good ball player."

The milkers do no field work or trucking, except in emergencies. Their job is strictly in the barn. What with milking, chores and other jobs they put in a full eight hours or better every day.

Some of the farms have milking parlors, some still milk in the barn, some use a combination of the two methods. Most of them have pipelines.

Several farms have more than one dairyman. On the big farm at Derby there are four men milking two separate herds each of 120 cows or more. This farm has three bulk tanks. Hackett expects to eventually install another bulk tank here, add another 120 cows and two more men and go in for around-the-clock milking.

The problem of maintenance on a battery of farms like this is a full-time job for any man. Lanky, raw-boned Charlie Musgrove

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FARMHAND MANURE SPREADERS give you fast, easy spreading at lowest cost. They're built to cut upkeep costs way down. Features such as one-piece, treated ¾-in. marine plywood floors, PTO-powered worm gear-driven aprons, two-speed unloading and heavily built and braced steel frames make a Farmhand Spreader your best buy. See them all at your Farmhand dealers! He has a size to fit your needs.

6-TON "POWER-BOX" SPREADER
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BIGGER PAYLOADS, faster spreading, proven the best. The 6-ton "Power-Box" with Spreader attachment helps you get full value from manure . . . makes long hauls practical and profitable. This big, PTO-Spreader thoroughly shreds and evenly spreads huge loads. It has aluminum alloy sides, ¾-in. marine plywood bottom, full roller chain apron. Mounts on truck, trailer or wagon.

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A PTO-SPREADER with all the proven construction and operational features you've ever wanted. This new Farmhand 4-Ton "Power-Box" Spreader has flared sides, 2 steel beaters, and specially-designed "widespread". The aluminized steel sides and ¾-in treated marine plywood floor assure many years of trouble-free spreading.

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TOP PERFORMANCE at lowest cost . . . with the new Farmhand "110" Spreader. Here's a PTO Spreader with 110-bu. capacity, steel sides and ¾-in. treated marine plywood floor. Rugged new design "widespread" shreds and spreads evenly. Beater can be shut off while apron keeps running, for positive cleanout. Top beater for leveling off high loads is optional. Two-speed apron . . . 100% operation from tractor seat. Choice of 15, 16 or 20 in. wheels.

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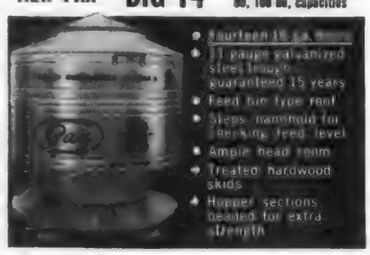
Fourteen 14" x 4" Risers
11 gauge galvanized steel trough guaranteed 15 years
Feed bin type roof
Steps nestmold for checking feed level
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is Hackett's foreman who takes over in his absence and acts as chief repairman. In this latter capacity he is in charge of a completely equipped repair garage and a portable workshop mounted on a Dodge truck chassis. This shop-in-the-field is equipped with an electric arc welder, an acetylene torch, a wide assortment of nuts and bolts, crowbars, axes, hammers, saws, a half-inch drill and other small tools and a generator to power the welder or to furnish the power for the milking machines whenever a storm knocks out the current at one of the barns.

It All Goes Together

Hackett credits the quota system for the greatest part of the increased efficiency on the farms in the last two years. "Spoilage—cows going bad—is only half what it was before the men went on commission," he points out. "It used to be that when they had a sick cow they'd always be going to 'fix her up tomorrow'. Now they get after her right away. You've got to sweeten that milk with a little something interesting for the man who's doing the milking.

"And you've got to watch every detail. It all goes together, better cows, better barns, better feeding, closer attention to details. I used to hay so darned much I let a lot of things slip. Now I buy most of the hay and pay attention to the things that add up the dollars.

"I am willing to feed my cows all they can eat. But if they don't produce, out they go.

"I don't hesitate to pay my men a bonus and I don't expect them to do anything more than the job I assign them. But if they don't fill their quota, their days are numbered.

"As for me, I have to keep the whole thing under control like a man driving a big hitch of horses. My job is to stay on that seat and handle the reins. If I do anything else the whole darn thing will wind up in the ditch."

IT PAYS TO KNOW

THE TRUE VALUE OF YOUR FARM

Whether or not you plan to sell your farm or farm property knowing its true value on the market today and the long range earning possibilities are of utmost importance. For example, as described in a recent issue of FARM QUARTERLY, the law of eminent domain can take your property for public improvement or necessity. This is happening more often today because of the increased road building program. And for tax purposes and for insurance you should know its true value. A Professional Rural Appraiser can save you money and trouble . . . he will estimate the immediate and future value of your property or any part of it.

Yes, it *pays* to know the true value of your farm and farm property. Write today for list of Professional Rural Appraisers for your area. There is no obligation.

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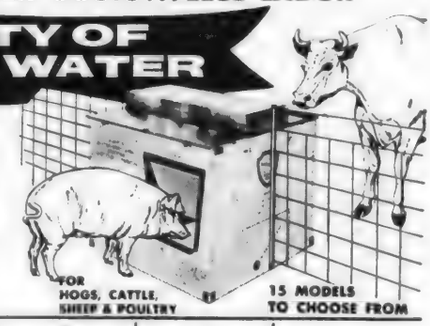

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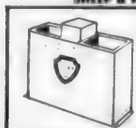
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No. 5 Cattle Waterer for the average size farm. One of 3 models.

The 2AA . . . One of the most popular RITCHIE Hog Waterers.

WHAT PRICE HOGS?

(*Continued from page 79*)

B. Parker Newsom, Columbus, Indiana, is in partnership with his sons in a Hampshire breeding and a commercial operation. He says: "Hogs may go as low as $15, but at that price farmers can still make money."

Everett Hackman, Ottumwa, Iowa, sends 1,200 hogs to market each year. "I expect a drop in prices, but I don't believe it will go below $16 or $17. I will have a big spring farrowing next year and expect to take less profit on a hog, but I'll have more hogs to sell. Feed will be relatively cheap, and that will allow farmers to make more money than the price of hogs would indicate."

Martin Katter and his son Marvin, Wapakoneta, Ohio, are typical of the breeders. They raise purebred Durocs and took a grand slam in the Durocs Division of the Ohio State Fair. He says: "We don't intend to alter our production. I have figured out that we can make money next year on $14 hogs because feed will be cheap. We are going to feed all our wheat, which was pretty bad. I don't expect hogs to go as low as $14, but if they do we will still make a little money."

Chester Garner markets 1,200 hogs from his farm nearly 80 miles west of Omaha, Nebraska. He expects feed to be cheaper, and he expects hogs to go down, but he is not going to cut down his production. He analyzes his situation in this way: "Hogs are certain to go down, and a good many people will get out of the business, and some of them will cut down. Then they'll be scarce and I will come on the market with a good many more hogs than I have now to take advantage of the mistakes of the in-and-outers."

"Whereas the government is predicting a 13 per cent rise, I can't see more than a 3 to 5 per cent increase," A. B. Evans, one of the country's largest purebred Hampshire breeders, said. "No one is running over me to get hogs. I have always found that the purebred business is a good indication of what hogs will do next year. While the fall pig crop will total larger than last year, demand is good and the price will be determined on how well the farmers market their hogs. Orderly marketing of hogs in a weight range of 180 to 220 lbs. will keep pork tonnage down and prices should not drop too far."

The Barnes brothers, Frank and John, farm about 1400 acres in a bend of the

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Herbert Woods, Manager and Van Brewer, Herdsman (left) WCM Farms, Taylorville, Ill.

"We bought our first 4 Caswell Farro-Crates from the Mavis Grain Co. (Rochester, Ill.) strictly on a trial basis. Our results? When the sows farrowed in the Farro-Crates we saved every pig—when they farrowed in the pens we lost at least one pig per litter. That's all the proof we needed. Soon we were in the hog business in a big way—with a new farrowing house and 16 more Farro-Crates. Now we farrow 20 sows the first of every month without worrying about losing pigs. Our top hog profits actually started when we began farrowing pigs the modern way . . . in Farro-Crates."

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The all-steel Caswell "FARRO-CRATE" is the original farrowing stall . . . farm tested over 5 years . . . and the favorite among thousands of top hog producers, purebred raisers and agricultural colleges all over the country. *They prevent sows from crushing baby pigs!* Don't take chances on hog profits. Farro-Crates are collapsible, portable and can be hung up or stored outside when not in use. Cheaper and better than lumber. Handle any size sow. Available as single units or in multiple series. Guaranteed.

"We now farrow 20 sows every month"

"No crushed pigs here. The pigs we saved in one year paid for our Farro-Crates"

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Get top hog prices by selling at correct weights. Avoid being "docked" for lights or heavies. All-steel Caswell WAYO-CRATE scale is extremely accurate. 500 lb. capacity Portable. Low in price.

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Scientific Bulletin No. 3

Mysterious Vitalizer Gives Pigs Amazing Growth

One Injection of FE-50 Increases Weaning Weights Far Beyond Expectation

The biggest single farm news story for 1958 has been the amazing power one injection of iron dextran complex (FE-50) has had in the prevention of baby pig anemia.

Today, the news is more startling. Besides preventing anemia, FE-50 actually helps boost growth. Many farmers report that *by weaning time* their FE-50-injected pigs put on as much as 8 "extra" pounds.

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Inject one shot of FE-50 directly into the ham of a 1-day to 14-day-old pig. Instantly the extra iron vitalizes his system.

Insist on Anchor FE-50

Only the iron dextran complex in Anchor FE-50 is capable of producing this "bonus vitality." FE-50 is carried in fresh supply by your nearby Anchor dealer. See him.

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ANCHOR FE-50

ANCHOR SERUM COMPANY

Saint Joseph, Missouri

Manufactured under license of Benger Laboratories, Limited, England

Missouri River at Atherton, Missouri. They keep about 100 sows, raise some 200 litters a year. Frank says, "Pigs going to market March 1 and after will be $15 or under. In the fall of 1959, I think hogs'll sell under $12."

The brothers aim to make the best of the situation, maybe even take advantage of it. Frank continues, "We've got our operation set up and will continue the way we have. We might sort our sows down a little harder. We do intend to build up our breeding stock. We always work our breeding stock over in these low times—it's so much cheaper. And when the market rides itself out in two or three years we'll be ready to go again."

Gail Long, Monon, Indiana, markets 500 hogs on his 400-acre farm each year. He says, "Hog prices will decline to around $15 to $16 in 1959. I can raise them for that level of prices if corn and other feeds remain low. I don't intend to change my plans."

Robert Anderson, Route 2, DeKalb, Illinois, plans to market 300 hogs, his usual crop, in 1959. He says, "I don't think hogs will go below top prices of around $14. I can make some money at this price and I'll stay in. The forecasts have often been wrong, and they can be this time."

ROLLING HILLS AND RUGGED CATTLE

(*Continued from page* 64)

grazers operate on the theory that it costs too much in time and money to put up hay. They do not have enough good hay land anyhow, they say, and, besides, the cow is better off rustling for her feed and getting the exercise that keeps her in good condition.

But the haymakers feel their cows need more than they can rustle for themselves during the winter. For them the Fourth of July is not so much a national holiday as the beginning of the season of work, sweat and tares. Every cowhand on the place chucks his slant-heeled boots under the bunkhouse bed, slips on a pair of work shoes, and resigns himself to a job on the mower, the rake or the stacker for the next six to eight weeks.

In feeding, the ranchers use a piece of equipment which is indigenous to the Sandhills. This is the hay sled, which, today, has become a sled in name only. It is a four-wheeled low-boy with a bed 12 to 16 feet wide and 14 to 20 feet long. Half, or even whole, stacks are cabled onto these sleds and hauled to the spot where the hay is to be fed.

Much of the feeding is still done with horses and a good many ranchers who were using tractors are returning to horses for their feeding, some even for haying. Harness and horsedrawn equipment is almost impossible to find. But the Sandhills

horseman are a stubborn lot and they are solving many of their problems by building their own equipment.

The S. C. A.

Besides their wonderful grass and fine cattle the Sandhills ranchers have a third string to their bow. This is their somewhat unique marketing cooperative, the Sandhills Cattle Association.

Back in the late 30's, a number of the cattlemen decided that quality cattle such as they had to offer deserved much better selling opportunities than they were getting. So they organized the Association to advertise the cattle, contact potential feeder buyers and conduct sales.

"Before the association was organized," explains Frank Cosgrove, of Long Pine, "we used to sell our entire bunch without any regard to grade or size. The feeder took them all, the good ones, the bad ones, the big ones and the little ones, usually at one price. And that price seldom reflected the value of the better cattle.

"But we found that when a feeder can buy quality cattle that are uniform he'll pay more for them. And he gets a better deal, too, because the cattle will feed out better. So now we sort our cattle, put them up in uniform bunches for weight, grade and sex and consign the best to the association sales each fall. That's the way to get a premium on your product."

The Association today has a list of 800 members with over one million head of cattle. Only a small percentage of the stockers and feeders go through the Association sales. The balance are sold with the help of the advertising and public relations material which Association Manager Frank J. Sibert and his staff turn out.

To keep the prospective buyers—some 25,000 Corn Belt cattle feeders—appraised of conditions on the Sandhills ranges and the state of the market, the Association puts out three publications.

First there is the very attractive bulletin, a book about the size of Time or Newsweek. It rolls off the press about the first of July each year and lists the names of all the members, their brands, the location of their ranches, and the kind of cattle they have for sale.

Twice a month during the selling season, the "Sandhills Feeder

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Cattle News" goes to all the feeder customers. This is a subscription deal at a charge of $1 per year. The "News" is a capsule form, four to eight page mimeographed report of the goings-on in the Hills with emphasis on the market. It carries accounts of recent sales, both private and public, and long lists of cattle for sale or contract.

The third Association publication is the members' News-Letter, also done on a twice-a-month basis the year 'round. Like the "News" its purpose is simply to keep folks informed as to available cattle, range conditions, selling prices, shrink adjustments, employment opportunities and other developments in the Hills.

With these publications circulating around the country there is no reason why anyone in the market for cattle should be ignorant of what the Sandhills have to offer. But the Association does not let the matter stop there. It sets up tours through the Hills for interested groups of farmers and feeders and encourages delegations of its own members to visit Corn Belt lots to see how their cattle perform on feed.

Spotted throughout the area it has sub-offices—gasoline stations, motels, crossroads stores—all displaying a bright red and white sign and equipped to advise the traveler on available cattle in the immediate vicinity and how to find them.

The big events of the Sandhills year are the Association sales. The percentage of member owned cattle which go through these vendues is small, but the quality is tops. The highest ethical standards prevail, no by-bidding is permitted, the cattle are offered without reserve in carload and half-carload lots, and the buyers, knowing they are getting a fair shake, come a-flocking.

Association sales are held every fall at such points as Valentine, Bassett, and Gordon. Most of them are teamed up with a preliminary livestock show of the sale animals, and usually barbecues, parades and other events precede the affair.

All cattle in the sales are pre-selected by a well-qualified sifting committee and, for the further convenience of the buyers, special trains and trucks are at hand to move the purchases to their new homes.

Top calves at the Valentine show and sale in early October this year were a load of 53 Angus steers which weighed an average of 413 pounds and brought $54.25.

Although a great many of the Association members never consign to the sales, they feel that the sales are a powerful influence in helping them to sell their cattle well. Elmer Phillips, a Bassett rancher-member who has never sold at an Association sale voices the opinion of this group. "These shows and sales have made us very quality conscious," he says, "we're just not happy with common cattle any more. And getting all those people out here does us a world of good. When I see those crowds come swarming in I know my $20 dues have been well spent."

THE AUTHOR: Farm Editor of the Omaha *World-Herald*, Don Muhm received the American Seed Trade Association award as "the best farm newspaper writer."

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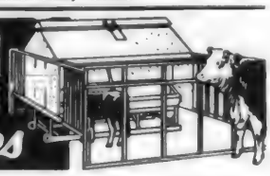

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Double stall creep feeder (left) holds 30 bushels, takes care of 40 calves. Single stall creep feeder (right) holds 12 bushels, takes care of 20 calves.

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CHRISTMAS ON DUTCH FORK

(*Continued from page* 73)

complex and confusing, except to the women.

The shank of the holiday season was "between the two Christmases," that is, the week between Christmas and New Years's Day. The intensity of the reunion built up before that and frazzled out after it. The routine was rather fixed. For the men it was the hunt, mainly by day, but occasionally a group wanted a 'possum hunt too, and that called for night. Game was plentiful. The favorite was quail, and they brought in bags full, as there was no limit.

As fine as the days were, nights were even finer. Then we all met at the ancestral home, known to all as The House. After supper all took the winding path to The House. On old maps The House is shown as Veal's Tavern or Eleazer's Tavern, and still stands. For it was there the stagecoaches stopped in an earlier day, and herdsmen from what was the frontier then across the mountains in Tennessee, put up for the night, with their herds and flocks.

The living room, then, was not crowded even when the whole clan gathered. At the east end was an enormous fireplace, the only source of heat, but ample enough to make the large room comfortable. The set-back table was placed in the center of the room. There the "gambling element" of the clan had a most spirited game of cards every night, often into the small hours. The play was hard, but there was much teasing and joking, all in good humor. The women sat in a great circle around the wall and talked and changed about to get with the others. Most of them had embroidery, quilt patches, or other needlework that kept their unconscious hands busy, while their tongues wagged.

On the floor, between the circle of women and the card group in the center, we kids played. Most of the time we were fretting to go out and shoot firecrackers, which for some reason were a part of the Christmas tradition in our part of the country. We never saw them at any other time, not even on the Fourth of July. They were very scarce, and we husbanded them closely. When one of us decided to give up one of his treasures, everybody wanted to hear the bang. So the men lay down their cards and the women their handwork and out in the dark night they went. One of the men brought a shovelful of burning embers from the fireplace and put them in a little pile in the red clay yard. There we kids shot a few of our precious firecrackers each night. Wild ones among us would chase each other with Roman candles, shooting sizzling balls of fire at our companions as they scurried all over the yard and took refuge down behind the woodpile.

One night during Christmas week was set aside for Christmas exercises at the church. That was when we kids showed off. Our teachers and parents coached us for weeks in our little pieces and songs. We always had a large cedar or holly tree that filled one corner of the church. On it was draped long strands of bright red holly berries and popcorn that we strung for that purpose. They were the only tree ornaments we knew. Our lights were candles, saved from one year to the next. At one point in the program, the oil lamps that hung from the ceiling were put out and the candles over the tree lighted. Then we sang Silent Night. Soon the lamps were re-lit and the candles blown out to save them.

I always dreaded saying those pieces, and I somehow escaped until up some size. I'd beg out in some way. But all of the other kids were showing off, so my folks felt embarrassed and urged me to try. They taught me a little 4-line verse, which took several weeks. I was to be one of a group of 5, 2 boys and 3 girls. They put me in the center, as I was a lot bigger than the others. This was purely primary stuff, but it was heavy for me. The first two on my right rattled their verses off without a hitch, but I got more and more scared. When it came to me, I turned to stone. I couldn't think of that first word. Not only that, I doubt if I'd have known my own name then. There was a long and painful silence. My sister was the organist and sat right down in front of us. She tried to prompt me with the first word. It was "Remember." But it didn't mean a thing to me. I wondered why she was whispering "Remember, Remember" when that was all I was trying to do.

Each day had its own special event, but of all of them Christmas morning was the one that reached the peak of excitement and

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"We get plenty of rough weather in Minnesota," says Oswald Lyngass. "So we have to be sure of building construction that can take wind and snow loads. That's why I chose Rilco."

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anticipation. Our parents got up before dawn on Christmas morning and made a roaring fire and then called us.

Our gifts were mostly of the useful kind —knitted socks, gloves, scarves and sweaters. There might be a home-made rag doll for the younger girls and a few 10-cent presents from the variety store in Columbia. Ten cents would buy a pocket knife or a doll that would cost $1.00 now. Sometimes gifts were ordered from J. Lynn & Co. of Chicago which got out a catalogue full of wonderful things. My folks once ordered me a knife with a chain on it, the most treasured possession I ever had. I don't know why I remember the series of little pewter birds that you filled with water. If you blew on them they would gurgle and sing, and every Christmas someone got a pewter bird.

No Christmas week could pass without a minor or major crisis. One year we had a major crisis the day before Christmas, at least it was major for us kids. That was when a chronic drunk, from further down the road, got all liquored up and came whooping and yelling up our way. We kids were deathly afraid of him; we feared he'd stop, and he did. He came from Chapin, reeling and rocking and beating his lathered horse. He stopped suddenly in our yard. And before we could run and hide, he saw us and called us to him. I've never been much more scared than that. In fear and trembling we went up to his buggy. He got out, staggered to the back, pulled the boot up, opened a sack, and from it gave each of us a coconut and a can of sardines. He said, "These are yours, and don't let your mammy have 'em." With that, he climbed back in the buggy, gave his horse a whack with the whip, and with a jerk that almost broke the singletree and all but threw him out, he was off down the road. We later learned that he had sold his last bale of cotton that day and spent it all for sardines, coconuts, and liquor. And that is what his wife and children had for Christmas.

All too soon the magic week was gone. Each day after New Year's our group grew smaller. We took them to the station and there was much kissing and waving of goodbyes, and yelling words of parting to those returning to distant parts. As the old woodburner pulled out, I'd get under the shed away from the shower of sparks, as it puffed away carrying our kinfolk into the night. We would follow the glow against the night sky for a while. But soon darkness took over again and we walked back up in the pines beyond Mr. John's place, where we found old Frank with his eyes bulged out with fright. Christmas was over! And we kids faced school again next day, and a bleakness that looked like eternity, before the magic season could come again. The new calendar was hung on the wall and a new almanac from the nail on the edge of the mantle there over the fireplace. Both of them looked mighty sad with Christmas covered by eleven deadly pages!

THE AUTHOR: Jim Eleazer, of Clemson College, S.C., is well known to our readers, who may recognize here the style of his book, "A Dutch Fork Farm Boy."

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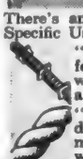

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(*Continued from page* 40)

tive. I belong to the Royal Society, and am a member of the Farmers Union, which is much like your Farmers Union, or your Grange. The Smallholders Association excludes me as a member—my farm is too large. I am not a member of a consumers' cooperative. In many ways the consumers are at cross purposes to the producers, and I'm a loyal producer.

"If I attended all the regular meetings of these groups my wife wouldn't see much of me, so I go only to the most important meetings. For most farmers, the monthly meeting of his cooperative is a social event he wouldn't miss for anything."

The local meetings do have one helpful function—they afford the farmer a sounding board for his opinions and a feeling of having a voice in the conduct of his own affairs. The decisions, however, are made in Olso at the National Federation Headquarters.

Sundby buys concentrates, receives artificial insemination service for his herd, and buys his dairy equipment through a cooperative. Everything bought and sold on the Sundby farm is through a cooperative —his pork, grain, potatoes and the products of his forests. He feels that he would get less under any other system, but that the cooperatives will never be able to solve Norway's problems of too many farms, too-small farms, an adverse climate, and the lack of large expanses of rich land.

"American farmers," Sundby said, "have more to work with."

And how does private business do with the cooperatives hemming it in on every side? "They do very well," says Sundby. "They give healthy competition."

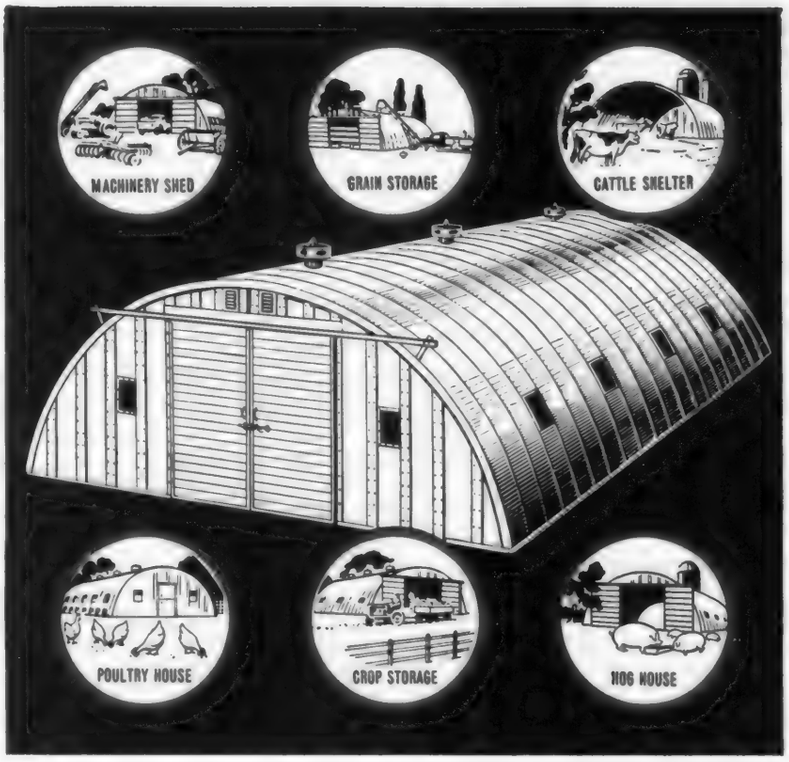
And how do they do it? "By more efficient management," Sundby admits. "We don't seem to be able to get all the good managers we need. About 25 per cent of the meat, eggs, forest products, and garden products is still private business."

Jon Sundby's farm operation is a good example of the better Norwegian farm. He milks 22 cows—Red Kolls, the ancient Viking breed, all registered. All feed (except for concentrates for the milkers) is produced on the farm. The concentrates are mostly herring meal with a small amount of imported oil cake.

Three men are employed the year 'round –one in the dairy and two in the fields.

"In America," Sundby says, "you would find no need to employ three men on a 100-acre farm. Here in Norway we have a short, intense growing season. When spring breaks, we must get our crops in at once. Often we work around the clock. Then when harvest comes, we must get everything out of the fields and under roof quickly, before the severe winter months. Two of my men work in winter in my forests, harvesting lumber, pulp wood, and fuel."

There are two tractors on the farm, a big Ferguson Diesel and a small machine.



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The big tractor is used a good deal in the forest. The Sundby barn is an enormous structure, with a big hay capacity and space for all the straw produced on the farm. The grain is harvested with a binder and hauled to the barn where it is threshed. Though there are some 3,500 combines in the country, most farmers in Norway have built-in threshers in their barns.

Considerable straw is used as feed. A recent innovation in the feeding of straw and low quality hay to dairy cows is to wet down a day's feed in tanks, let it soak for 24 hours, and feed the mixture in a soggy mass. Feed value is said to be increased by 15 or 20 per cent. Sundby believes food value is increased by a predigesting effect.

Sundby's cows get a 14 per cent protein supplement, and all the hay, and beet or grass silage they want. Production averages 10,000 pounds, butterfat about 4.5.

Fertilizer is subsidized by the government, and is cheap. Sundby averages 650 pounds per acre on his crops and pastures. A 100-pound bag of 6-6-6 costs about a dollar.

Mr. and Mrs. Sundby live in an eight-room, two-story wood house with a steep roof to shed the snow. Many fine antiques are scattered around in the spacious rooms. Heat is supplied by big, wood-burning Finnish-type stoves. There is a modern bathroom, a farm luxury in Norway.

"Taxes are high," says Mrs. Sundby, "especially inheritance taxes. We just don't know what to do with the farm after we pass on. It would be a liability to our son—he couldn't make a living here, unless he ran it himself, but he doesn't want to farm. There isn't enough in it to hire a manager. That is, enough to pay a good one."

Although in Norway both income and property taxes are exceptionally high, medical and hospital services are practically free. Illiteracy is unknown, and no aged person ever faces want. There is no poverty; no slums in the cities; and the national diet is among the best in the world. The Norwegians drink more milk, per capita, than any other people. A good deal of the credit for this high intake goes to the dairy cooperative, supplying a fresh quality product.

In comparing these farmers with those of many other countries, I was struck with the lack of extremes—the national average is the actual size of most of the farms. There are no fabulously rich farmers such as I saw in the Dominican Republic, but there are none as poor as the Spanish. When you think of their health and welfare benefits, their exceptionally high literacy, their lack of slums, the participation of the farmers in the affairs of government, and their ability to adjust to machine agriculture and keep small holdings, you conclude there is a sound reason to claim the standard of living of the Scandanavian is the highest in the world.

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BIRDSFOOT TREFOIL

(*Continued from page* 47)

and scattered in the droppings all over the field. It's a slow process, but one which happens with any seed which is not easily digested."

Birdsfoot trefoil is a deep-rooted, perennial legume with a bright yellow flower. The seed pods are slender and clustered in the form of a bird's foot, hence the name. The tap root is branched and makes the plant more resistant to winter heaving. The stems grow from the crown, much as alfalfa stems, but they are fine and weak, and flop over unless supported by a companion grass.

There are two main species of trefoil, the broadleaf and narrowleaf. The narrowleaf type is most common in California. It tolerates a wider range of soil conditions than the broadleaf, but cannot be grown where the winters are cold. Narrowleaf is particularly good in withstanding excessive moisture. Broadleaf has much more upright growth.

In the East and Midwest, broadleaf trefoil is the common type. Much of the seed is imported from Europe. This imported seed is of no particular strain or variety, but differs from Empire, the most common domestic variety, in three ways: plants from imported seed have more seedling vigor; the plants stand more erect, and the imported strains recover more quickly from cutting or grazing.

Several tests have shown Empire trefoil more winter hardy than imported strains, and better adapted to grazing. However, Empire is slow to recover in the spring—the imported strains have a shorter winter dormancy period. There are several other domestic broadleaf varieties a farmer may come across—Viking, Granger, Tana, and Mansfield are at present being tested. All except Empire have a fairly erect growth. Empire is more decumbent, and has generally been more persistent than the others. Empire and Viking are more winter hardy than the other varieties, but the erect growing strains are more productive when grown for hay.

Empire is the choice of Howard Donhauser, who has 230 acres of birdsfoot trefoil on his farm near Albany, New York. Most of this is in hay fields. "We have about 130 acres of permanent pasture which we are slowly trying to seed to birdsfoot," said Donhauser. "We have tried a few acres of European birdsfoot, but have found that in our location it does not compare favorably to Empire in longevity, yield or adaptability to poor land."

Donhauser gives four good reasons for using so much trefoil. First it out-yields other grasses and legumes on his farm; second, with new sprays to remove weeds, the trefoil lasts from eight to twelve years; third, in feed value it compares to alfalfa—both have about 17 per cent protein, but trefoil is less stemmy—and lastly, birdsfoot will survive through spring heaving and

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"Our yields," said Donhauser, "have been good compared to most. Last year we averaged 10.3 tons of silage per acre, and 1.2 tons of second cutting hay. One good first cutting of hay went to 3.8 tons an acre. A more normal yield is 2 to 3 tons. With good fertilization, trefoil will give good yields. We use about 300 pounds of 0-20-20 an acre. We find heavy applications of manure tend to drive out the trefoil in a couple of years, so we go light on the manure, and heavy on the commercial fertilizer.

"We use some timothy in our seeding mixtures. Pure trefoil," said Donhauser, "unless used for pasture will give harvesting troubles, and decrease yield somewhat. Trefoil has a fine stem which will not support its weight when grown very large. So by planting a few pounds of timothy per acre, the trefoil has more support to keep it from lodging. Also the timothy will help increase yield."

Donhauser uses oats as a nurse crop, seeded very lightly. But he has another system for pastures that are too stony or too steep to work. He spreads manure on the pasture with one-quarter to one-eighth pound of trefoil seed on each load of manure. "If they are applied together," said Donhauser, "the trefoil will usually start. Applied separately, the trefoil doesn't start well. Manure should be kept off new seedings for at least a year, to give the trefoil a chance to get established, but this one exception works for us." He had one last warning, "Trefoil will stand up well to close grazing, but for good regrowth it should not be grubbed close to the ground."

"A farmer has to use every legume for its advantages," said Professor R. A. Briggs of the University of Minnesota. "There are places where some particular legume is the best choice. Alfalfa, for instance, has poor acid soil tolerance, and poor wet soil tolerance. Birdsfoot trefoil would yield more under both these conditions. But, under optimum conditions, alfalfa would produce about 50 per cent more forage. In tests in California, birdsfoot showed outstanding salt tolerance.

"Apart from yield, the present varieties of trefoil lack persistency," Professor Briggs continued. "But there hasn't been enough research on trefoil to fill a hat, nothing compared to the other

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legumes. The only varieties available today are selections; there has been little plant breeding."

Professor Briggs, a young, enthusiastic man, with quick, almost sharp movements, reached for bulletins to corroborate his words. "When you look at alfalfa, you realize there's an alfalfa breeding program at every station; on trefoil, there's nothing.

"I've been appalled that research funds for trefoil breeding have not been made available," said Professor Briggs. "There are tremendous variations in the crop as it is today, and I feel sure varieties could be developed that have yield, disease resistance, and winter hardiness." He finished firmly, "To me we're where we were with alfalfa 50 years ago; a lot of work is needed."

Winter hardiness is a stumbling block for birdsfoot trefoil in the northern states. But again, conditions and treatments make a wide variation in winter kill. The Red River Valley, in north Minnesota, is one of the largest seed producing areas in the States. This year it produced nearly half a million pounds of seed, or well over a third of the U.S. total. There they have no winter kill problem. The stands remain well established. Yet three hundred miles south stands have gone out time and again in the cold of winter. The answer here seems to be in grazing. The crop often goes out under heavy pasturing in northern areas.

The Other Story

Ed A. West, of Oakland, Oregon, has had happy experience with birdsfoot—which he calls Lotus, after the Latin name. He said, "Last May we seeded 27 acres that had been in oats the previous year. The land was not plowed, but disced good in the fall and again in the spring before planting. We put on six pounds to the acre using a broadcast seeder followed with a corrugated roller and no fertilizer of any kind.

"About ten days after planting we had a good rain, and a shower or two before the middle of June. After that, until late September it never had a drop of water. The stand is perfect. On the 15th of July we turned 100 head of feeder lambs on the 27 acres. After two months they were sold at an average weight of 85 pounds with a daily gain of about half a pound. The last month we fed about a quarter of a pound of grain a day. We will clip and rake the field to clean the weeds, and next spring there should be a fine crop of hay."

There is one man's experience. Yet Howard Kaerwer said, "Trefoil is quite susceptible to drouth during its establishment stage, although later it tolerates drouth pretty well."

Ed West continued: "We like Lotus. When everything else is dry and brown, it is still green. In this country our native grass is gone by the last of July, and most of the clovers, unless irrigated, are dry. But not the Lotus. This year we had an exceptionally hot, dry summer; over 60 days without a drop of rain, yet the Lotus never stopped growing. This fall," he added, "we threshed 2,000 pounds of seed off 15 acres of two-year-old Lotus. This was after pasturing it off in the spring, then cutting a good crop of hay. Now, in September, we have 150 ewes on it, and they are doing fine. They really like that Lotus."

For West, forage is only one of the uses of birdsfoot trefoil. "Seed is a pretty good crop here," he said, "there is quite a demand. It sells for around 90 cents. We feel we learned some things about threshing. It is very tricky stuff to handle. You have to

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mow early in the morning while the dew is on. Then you rake right after the mower, or better, use a windrower, make small shocks, and put them on 4 by 4 foot paper. The shocks are allowed to stand until thoroughly dry. The thresher is run as slowly as possible, with very little wind, for best results. The crop must be cut at just the right time—when a maximum of plants are ripe, but before they shatter. A day sometimes is too long to wait."

The Bloat Free Crop

Birdsfoot trefoil has the unique reputation of furnishing bloat free grazing. Every reliable source agrees cases of bloat on trefoil pasture are extremely rare, perhaps nonexistent. This is true throughout its growing area, whichever variety is grown and whether the plant is alone, or sown with a companion grass.

The reason is far harder to come by than the evidence. No one knows why this legume should be free from a danger that is always associated with legume pastures.

Trefoil in the South

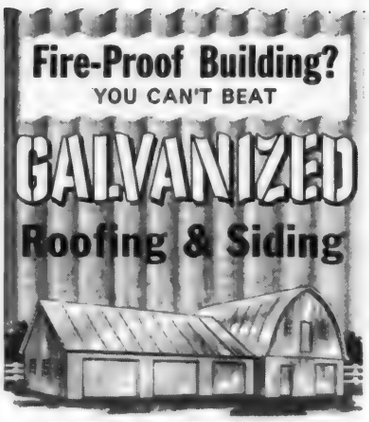
In the southern part of the trefoil area, roughly below the 40th parallel, the legume is much shorter-lived than in the north. In most cases this is due to root and crown rot which thin out stands in the second, third and fourth years. Some researchers believe this may happen in northern areas as well.

Again the lack of varieties is a handicap. Dr. Joe Baldridge, of the University of Missouri, said, "Birdsfoot trefoil would find considerable use in Missouri if well adapted varieties were available. Trefoil outyields lespedeza, tolerates drouth better than ladino, thrives better than alfalfa on the poorer or wetter soils and under grazing abuse; it is non-bloating, can make good yields of high quality feed, and may last indefinitely in places where commercial varieties are well adapted. But in Missouri, stands of trefoil haven't lasted as long as they should. We believe the trouble is root rot diseases that destroy plants outright, or weaken them so they are later killed by summer drouth or winter cold."

J. Ross Fleetwood, extension agent for the same university said, "We don't have as many stands in Missouri today as we had five years ago. Various farmers," he explained, "have established stands, but for many reasons lost them.

"Trefoil," Fleetwood continued, "just won't take competition while being established. It is slow in development, and often weakens after two or three years here in Missouri. But we think that may be the root and crown disease."

Fleetwood believes birdsfoot trefoil will become more popular under the Conservation Reserve program, which the government is stressing to replace the Soil Bank in 1959. "You sign up for 3 to 10 years," he explained, "and take 80 per cent payment for seeding down to a cover crop. You



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can't use it for the period for which you are signed up—but you have an excellent chance to get a good stand of trefoil. An ideal mixture," he said, "would be eight pounds of trefoil, one of bluegrass, and three of timothy. The timothy dies out after two or three years, and you hope the bluegrass and trefoil are left, and the trefoil will beat the root rot.

"There isn't a crop that offers more promise than a good stand of trefoil," said Fleetwood, "but there have been hundreds of acres of good stands just withered away—at experiment stations, at demonstrations, and on ordinary farms. Again, some farmers have had a fine stand. We hope a root rot resistant variety can be found which will handle the problem." He mused, almost to himself, "It's a strange crop. I don't think we have ever worked at anything for 15 years, like we have with this, without either doing something, or giving it up."

Brighter in the North

Excluding California and the West where they use the narrowleaf trefoil, the states with largest acreages are New York, Indiana and Iowa. Here there are commercial stands flourishing in wide areas. The crop experts recommend it as a permanent pasture legume, while warning of its slowness in becoming established. They advise spring sowing, as the weak early growth may not last the winter after fall seeding.

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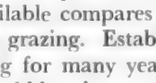
Like all legumes, birdsfoot trefoil must be inoculated with a special bacteria culture. Nearly all seed companies handle the seed, and dealers have the inoculum for sale. A new process should do much to cut out the tedium of legume inoculation for farmers. This "Noculized" alfalfa seed is already available, and treated birdsfoot trefoil will be available within a season or two, according to the processors, Northrup, King, who perfected it with the aid of the Battelle Memorial Institute, Columbus, Ohio. The seed comes to the farmer already inoculated, as the trade name suggests. This inoculant lasts for at least six months, as it lives inside the seed. The seed comes to the farmer dry and clean, and needs no treatment before sowing.

The Noculization is a new process. The seed is covered with the inoculant bacteria, and then put in a special chamber. The air is removed from the chamber, and some of the air contained *inside* the seed is drawn out. Then the vacuum is released, and as the air rushes back into the seed, it carries with it some of the tiny bacteria. Inside the seed they are protected and live for several months, without harming the seed. With normal inoculation, the bacteria stay outside the seed, and die in a few hours. Such seeds must be planted immediately after inoculation. Northrup, King hopes the process will soon be available on all legumes.

To establish trefoil, several states have been experimenting with chemical cover crops, but oats remain the favorite nurse crop. The oats may be harvested for seed, or cut or grazed earlier in the year. Seeding alone, without nurse crop or chemical is a third method which some growers recommend. With this method the weeds should be clipped once or twice the seedling year. In any case, trefoil needs fertilizer and the requirements are best judged by a soil test. It prefers a slightly acid soil, pH 6.0 to 6.5.

Birdsfoot trefoil is an enigma. In Missouri, the picture was not bright, but in the next state, Iowa, a professor of agronomy said, "Birdsfoot trefoil is a valuable pasture legume in Iowa. No other pasture legume now available compares with trefoil in its ability to withstand continuous grazing. Established stands can be expected to furnish grazing for many years. The quality of such pasture is usually high, and bloat has never been a problem. Thus, birdsfoot trefoil is now recommended as the best available legume to improve permanent pastures in Iowa."

There is the evidence, decide for yourself.



IRRIGATION FROM BELOW

(*Continued from page* 54)

a rye cover crop started. Even this last year, when rainfall was unusually heavy, Gehring used the sprinkler systems to fight wind erosion in his onion fields. In a normal season on Gehring's farm the sprinkler systems may have run for 500 hours. Now, after 10 years, Gehring is replacing pumps and motors as they wear out. The cost of each of his 12 high-pressure sprinkler systems is about $15,000.

Gehring knows the cost of irrigating. All the details are carefully recorded. A year's total operating cost for labor and power for each sprinkler system is $236. The cost of putting down an acre inch of water is $3.70 and his annual fixed cost per acre, for depreciation and interest on equipment, comes to $6.95. Gehring's original cost for sprinkler irrigation systems came to $55.55 an acre.

Most farms employ only a single type of irrigation system. Gehring has put two to good use to help him build up his production and insure crop yields. To Gehring and Munter each system has its place in the operation.

The important point, they agree, is to get the water to the growing crop. How this is done depends on the condition. "But *whether* it's done," Munter emphasized, "can easily make the difference between a good crop and a bad year." It's evident to both of them that man-handled water has been a major factor in helping build up one of the largest and most efficient farming operations in America.

NO SURPLUS IN SUGAR BEETS

(*Continued from page* 61)

After the mechanical harvester has beheaded the root, the tops of the beet and the leaves remain on the fields. The tops are excellent livestock feed, but must wilt for a day or two to rid them of oxalic acid which causes scouring in animals.

Claire Davis, of Staten Island, California, has a six hundred-acre allotment of sugar beets on the 9,000-acre farm he manages. He grazes the tops as they lie in the field. "We prefer a shower of rain to wash the dust off," said Davis, "particularly on the light soils, but we wouldn't dream of wasting them."

The tops also make excellent silage. For the best feed, they are cut with a forage harvester before the roots are lifted. They can be ensiled with dried beet pulp or corn to absorb excess liquid. Though extremely palatable, the silage must be fed in controlled amounts as it can be laxative. When the fresh green tops are fed, limestone or chalk, two ounces per 100 lbs. of tops, keep scouring to a minimum.

Two other by-products of the beet are the well-known molasses and the pulp. Both result from the extraction of sugar. The factory, a catacomb of tubes and pans, first cuts the beet into shoe-string slices. These are soaked until their sugar dissolves in water. The slices are removed, squeezed and dried to form the beet pulp. The sugar syrup is purified, filtered and then boiled in a vacuum. The sugar crystallizes and the crystals are separated from the remaining liquid in a whirling centrifuge. The liquid spun to the sides of the centrifuge is boiled again and more sugar removed. What remains is the familiar, oily-black molasses.

This syrup has unending uses, on and off the farm. Though beet molasses is not used for human consumption because of its flavor, it can be fed to livestock and is widely used in industry. Much of it is fermented to produce industrial alcohols.

The beet pulp can be used wet or dry, although it is not practical to carry the wet pulp far. One of the largest users of the wet pulp is a feed lot of the Spreckels Sugar Company of California, where contractors regularly finish 22,000 cattle a year on a

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among horses, mules, cattle, sheep and dogs call for treatment with SPOHN'S COMPOUND. A stimulating expectorant. Acts on throat and bronchial tubes to hasten relief. Used by world-famous horsemen for 55 years. At drug stores, or direct, postage paid, $1 & $2.

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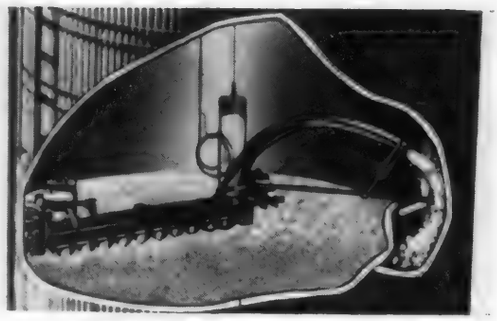

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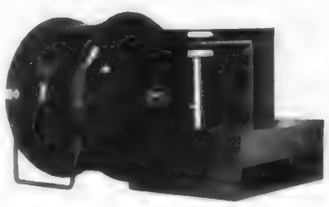

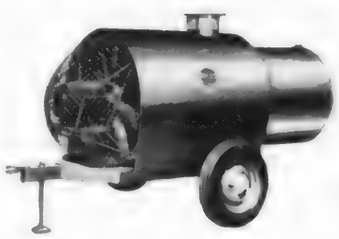

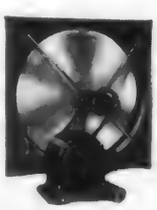

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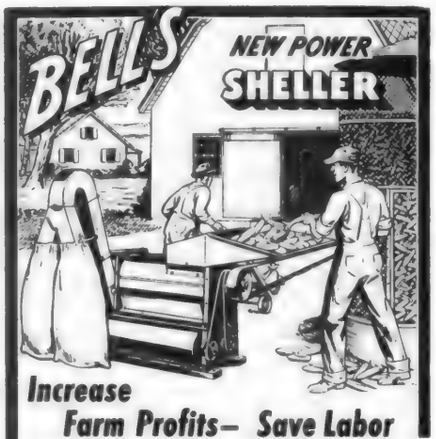

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ration using the pulp. But opinions of the pulp vary considerably. A dairy farmer in Michigan said, "Why buy that stuff at $50 a ton when I can grow oats for $20?" Yet, in California there are dairymen who grow the beets—four or five acres of them—simply to gain the preference given to growers in the sale of pulp. A grower gets a slight price advantage, and usually has first chance for pulp. Much of the pulp, however, is sold to manufacturers for mixed feeds.

Some of the factories pellet the pulp. A principal user of the pellets in Colorado is Warren Monfort at Greeley, whose feedlot operation turned out 40,000 cattle last year. Monfort feeds four or five pounds of pellets with a ration of corn, barley, alfalfa and corn silage. "We don't take the pulp unless it is the right price," he said. "And we never take it unless it is pelleted. We've got too many cattle to fool with it in any other way."

High Sugar or High Yield

Although the pulp is salable, to the factory it is a by-product of which the less the better. For the factory prefers a high-sugar beet, which makes for cheaper sugar extraction. In California and some areas of the Mountain States the farmer is paid for the sugar percentage of his beets, as well as the weight. Not so in the Great Lakes area. Here the farmer is paid on the weight—at the average sugar percentage of all the beets at that one factory. Hence, a farmer's immediate concern is yield. In spite of this,

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however, the sugar content of California beets has fallen, while in Michigan it has risen. Professor Albert Ulrich at the University of California notes a drop in California beet sugar percentage from 18.08 in 1937 to 15.39 in 1956. However, sugar per acre has risen—from 2.65 tons for 1938-42 to 3.25 tons for 1953-57. To contrast, in Michigan both yields and sugar percentage have been rising annually.

Under most circumstances the sugar content falls as yield rises. A striking example of this is the 600 acres of beets on Chet Locke's 1300-acre farm at Lockeford, California. "We average about 20 tons an acre at about 15½ per cent sugar," said Locke, "but on our heavy ground, we've gone up to 40 tons—and down to 11 or 12 per cent sugar."

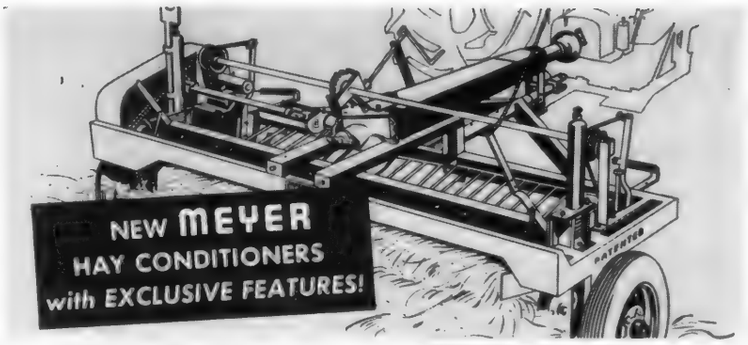
Strange things increase the sugar content of the roots. The two most important are nitrogen deficiency and night temperatures below 50 degrees Fahrenheit. Day temperatures and the absence or presence of other soil nutrients have less effect. The nitrogen problem is a tough nut — the chemical makes for high yields, but low sugar.

New weed controls are being tried and fertilization grows heavier. Nematodes, aphids, fungi and beet hopper—the pests of the beet—are attacked. Improvements at the factories make the extraction of the sugar easier, faster and more complete, thereby increasing their own profits and the returns to the farmer.

Two seed-producing areas, in Salem, Oregon, and Phoenix, Arizona, far from the growing areas, supply much of the industry. There is another seed-producing area in California and one in Utah. The seed companies are controlled by sugar beet companies. Constant research improves this seed, which must be isolated to avoid cross-pollination.

This Plan for Other Crops?

One firm contract, The Sugar Act, has brought organized prosperity without overproduction to this industry. There are no surpluses of sugar on the U S. market. Perhaps this type of law could control other agricultural productions and bring them into line with consumer demand. For the wheat crop, could the miller and the Kansan work out a contract to the advantage of both? And could the Kentuckian and the cigarette companies unite to handle the tobacco leaf as a joint enterprise until it becomes a filter-tipped smoke? There are other possibilities—cotton or soybeans—crops which require processing and can be controlled at the point of production. These are not beyond the bounds of imagination, for the huge sugar industry, changing, yet changeless, producing half of America's home-produced sugar, likes this act which regulates the flow of sugar from beet field to coffee cup.



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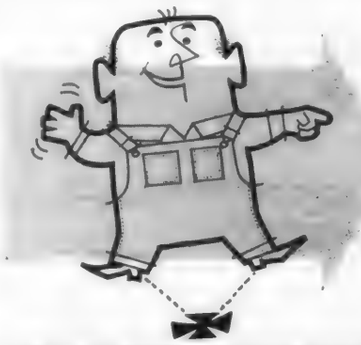

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A.I. ON THE RANGE

(*Continued from page* 44)

that way on my place. Another ranch I contacted had quit because it was too expensive and impractical. They just couldn't locate the in-heat cows."

But John Minor comes of pioneer stock who pushed past the bones of "those who didn't make it" and he is not one to be discouraged by the failures of others.

His cow sense told him that the way to find the in-heat cows was not to chase them all over the range but to make them come to him. He also determined there would be no "cowboying" of the cows to be bred.

Water on the Minor range is provided in huge tanks filled from wells by windmills. To bring the cattle to him, Minor simply enclosed each of two of these water holes in large paddocks into which all the cattle had to come to drink. The paddocks are provided with catchpens, cutting gates and holding chutes. When the cows in heat come to water it is easy enough with an arrangement like this to cut them out of the herd and hold them for insemination.

Operation Cow Watch

A crew of four experienced cowmen is hired to watch the herd continually during the breeding season to spot in-heat cows. Assisting them are six bulls fitted with canvas aprons. These bulls single out the cows in heat; the aprons prevent breeding.

Minor credits a great part of the success of his program to the extremely long days common to his part of Canada in mid-summer. Eighteen daylight hours give plenty of time to observe the actions of the herd.

A trained and thoroughly experienced inseminator is hired to do the breeding. Minor believes this is no place for a do-it-yourself project. His opinion is roundly seconded by experts on artificial insemination, and confirmed by the statistics the bull studs keep on the conception rates of their inseminators. Skillful artificial insemination is best done by a man who works at it the year around.

Insemination is done twice a day, at six in the morning and six in the evening. The in-heat cows are held in the paddock and worked into a long, pole-sided chute for insemination. This chute is 26 inches wide, has a rough concrete floor and sides about 5½ feet high made of poles lashed horizontally about 6 inches apart to pressure-treated posts. The open sides, Minor feels, are an important item. "You're not going to get a wild old range cow to walk quietly into a tight-sided chute where she can't see where she's going. Give her a chance to see and she'll be all right."

One attempt in using a squeeze was enough to convince Minor this gadget is not for him. "It makes too much noise," he says, "and all that rough stuff in holding the cow doesn't do her any good."

His chute holds four cows at a time. They are held in place merely with a bar in front, a bar behind and a bar over the neck. The

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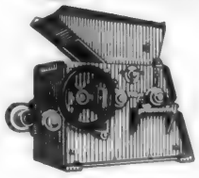

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last cow is inseminated first and allowed to back out of the chute. Then the third cow is serviced, followed by the others.

To insure a quiet, orderly operation, no more than three individuals—the inseminator and two assistants — are allowed around the corral during the operation.

Each cow or heifer is inseminated twice with a half ampule of semen each time. Those which are brought in in the morning are inseminated that morning, held in the paddock and again bred that evening. Those brought in in the afternoon are bred that evening and again the next morning.

Experience has shown that the most likely time for a cow to "catch" is late in the heat period. For this reason one that is brought in late, say at nine or ten o'clock in the morning or evening, is bred only once, being given a full ampule of semen at the next insemination period. It takes about one hour to inseminate 30 head.

No particular attention is paid to the calves of the cows held for breeding. They are left to fend for themselves during the half day or more their mothers are in the paddock. Outside of getting a little hungry they show no apparent distress.

Frozen Semen

A program like this would, of course, be impossible without frozen semen. Minor has a special refrigerator in the cook house at the ranch headquarters in which he stores ampules from the time they are delivered by air from Guelph until they are taken to the breeding pens in a special insulated kit. At the 112 degrees below zero maintained by dry ice and electric refrigeration the semen will keep indefinitely.

There is a difference of opinion among the experts on just how cold frozen semen must be kept. One school claims that 112 below zero is sufficient; and very satisfactory results have been obtained at this temperature. But American Breeders Service, one of the big national AI organizations, insists that 300 degrees below zero gives much better preservation and stores and ships all its semen in special refrigerators filled with liquid nitrogen. These containers may be rented to the rancher for $1.50 per day.

The essential thing is that the semen be alive and highly motile when it is thawed out. A microscope to check the quality of the semen becomes an essential tool on any ranch using AI.

Poor semen from one of the bulls (not a Waterloo bull) and a poor system for marking his cows were the most serious obstacles John Minor encountered the first year.

He tried to identify each cow bred by marking her with paint. But the paint rubbed off and positive identification of the calves or of the semen which had been used to breed a returning cow was impossible.

Every cow in the herd is now branded with a permanent number as soon as she is serviced. A record book is kept in which these numbers are entered showing when the cow was bred, what bull was used, whether she came back in heat, and, if so, when she was rebred, and any remarks as to her physical condition.

Because of the obstacles mentioned, Minor cannot pinpoint the results of his first year's experience with AI beyond the obvious fact that he has increased his calf crop—from less than 80 per cent to around 90—and has gotten calves of excellent quality. The Charolaise-cross calves, in particular, are growthy individuals which outweighed their straight-bred pasture mates 50 to 75 pounds per head last fall.

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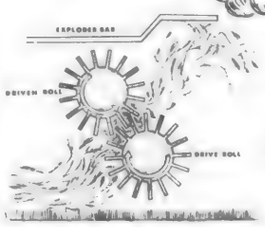

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Charolaise calves provide a positive check on conception rates, too. There are 170 calves on the range from 250 cows bred to Charolaise bulls during a 34-day period, one go-round, in 1957—almost 70 per cent. "Nothing to brag about," says Minor, "but not too bad for a first attempt."

Minor has no illusions about AI finding immediate acceptance all over the range country. "I haven't tried to sell it to anyone," he says, "because I don't want them to get hurt. They can get into plenty of trouble if they don't think their program through in detail."

And how about costs? John Minor went into the program, as was noted, primarily as an antidote to his declining calf crops and to get calves of better quality. But he is convinced there is positive economy in using AI. His total cash outlay for breeding 1070 cows was $3,495, an average of $3.26 per cow. Itemized it ran:

Wages for 4 cowboys	$ 925
Inseminator	1000
Dry ice, pipettes, etc.	500
Semen @ $1 per cow	1070
Total	$3495

These costs, it should be noted, are extremely low. Semen will often cost more in the neighborhood of $2 per cow. On a 200-cow herd one prominent bull stud quoted a figure of $5 per cow bred.

Minor still used 25 Angus range bulls this past year to pick up the cows the inseminator missed. Fewer could have been used but for the vast sand hill and brush range.

He estimates his breeding costs in the past to have run $5 to $7 per head using all range bulls, considering the cost of keeping the bulls, the poor job they were doing, and his estimate that for every bull eliminated he can run two cows.

"It costs at least $100 a year to keep a bull," Minor estimates. "We have to keep them separate all winter on range we could use for cows; and we grain them, which costs us another 30 cents a day.

"We used to use 50 to 55 bulls and we couldn't afford to pay more than $500 to $700 apiece for them. You're not going to improve the quality of your replacements much with that kind of bull. With AI we get service to $10,000 bulls; and you can see it in the calves."

For an Out-Cross

The LK Ranches, Ltd., one of the larger outfits in Canada with headquarters at Dalemead, Alberta, west of John Minor's place, has also adopted AI on a limited scale. But young, soft-spoken Neil McKinnon, who is supervising the program for his father and brother on the ranch at Bassano, has a somewhat different approach to it.

"I wouldn't fool with it for a minute," he says, "if we could get good range bulls. But the best bulls out of the herds that are supposed to be selling us seed stock go to the shows and we get the tailenders. We

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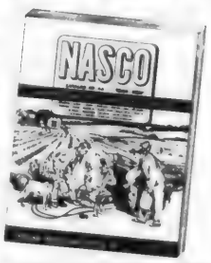

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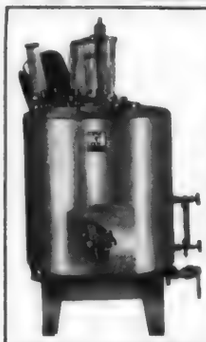

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use 80 to 85 bulls a year and you just can't buy that many good ones."

This past year the McKinnons used AI on 620 of the better cows in their Bassano herd and inseminated another 200 or so for neighbors. Their object is to team AI with performance testing, selecting replacement heifers from the artificially sired calves.

"This will give us good out-crossed cows," Neil McKinnon says, "to which we will eventually breed good home-produced bulls. It's a long range program. It will probably take us at least ten years to see results, but we are convinced it will work, if we can master AI."

He expects to use AI on not more than 600 cows each year. To emphasize the high standards he has set up for selection and the time it will take to achieve his goal, he pointed to a group of yearling heifers he was putting through the cutting pens last fall. "We are trying to pick 100 heifers out of that bunch of 380 for our cow herd," he said. "We weighed them when they went on grass the tenth of May and now we're weighing them again.

"What we want is a long yearling weighing at least 675 pounds with a minimum gain of 1¾ pounds a day; and she has to have what we consider good conformation. Instead of the 100 we want, we are going to have a hard time getting 75. That's why I say the goal we've set for ourselves is far away and hard to reach."

McKinnon worked his program very similarly to Minor's, but for a longer period of time. He started June 25 and cut off September 15, three full heat cycles.

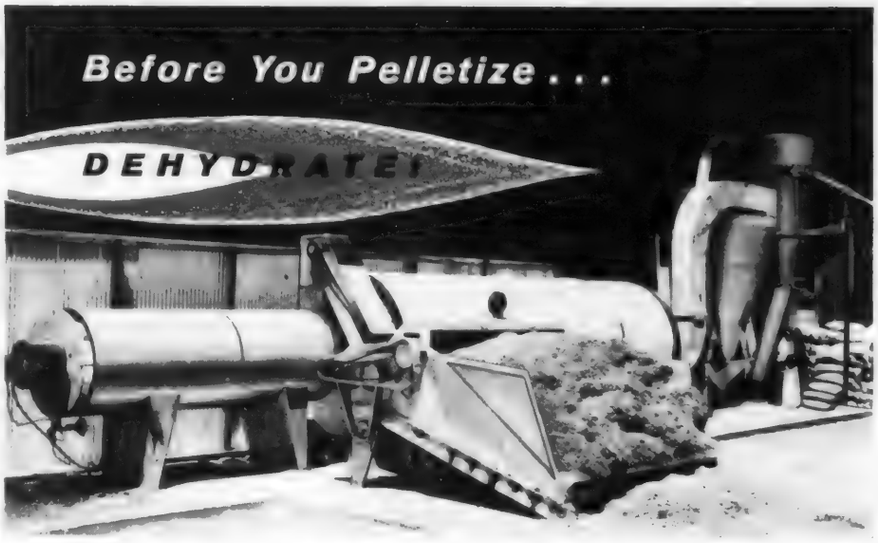
He patronized the same bulls which Minor used in the Waterloo stud. He advises that in fairness to the stud and to insure getting ample semen from the bulls selected, the semen should be ordered months in advance of the breeding season.

For the insemination work he fenced off a ten-acre field, catch pens and a holding chute similar to Minor's.

Three men assisted by three staggy steers cut out the in-heat cows. Cows picked up in the morning were bred that evening; those picked up in the evening were bred the next morning. Each cow was bred once.

Finding the in-heat cows is the key to success of AI on the range. Bob Knight, a top cowhand with more than 30 years experience behind him on the LK, was in charge of this phase of the program with the McKinnon herd. "I learned more about cows during those three months we were breeding than I had learned in all my life before," he admits.

Carefully checked scientific research confirms his statement. When Armour and Company set up its Beef Cattle Improvement Program at Denver last spring, a program designed to work with ranchers in breeding better beef cattle, it was decided to use AI as one of the tools. Before adopting the practice, however, Rand VanDervoort, a trained technician, was assigned to observe a number of herds in Nebraska, South Dakota, and Mississippi during three breeding seasons. With one Dakota herd



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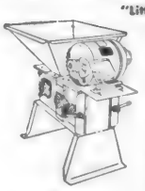

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numbering upwards of 450 cows he was able to detect 88 per cent of the cows in heat in a 41-day period in 1955. During the 1956 season he caught 94 per cent and the following year 98 per cent.

The indicators of heat or estrus are many. Riding is the most obvious. Others are: scuffed-up hair on the back; mucous smeared on the pinbones; trailing, one cow trailing another or the bull following the cow; bawling; non-affiliation with the calf; running the fence line; a kind of sweated hair pattern; a bloody discharge indicating recent heat.

Staggy steers, very young bulls (about six months old), bulls with aprons as in the Minor herd, or vasectomized bulls (whole males which have been made sterile), are a big help in stirring up in-heat cows. But they must be kept moving. If they follow one cow or get off in a corner they are of little help.

On both the Minor and the McKinnon ranges it was noted that warm or cold days had little influence on estrus. But weather seems to have a lot to do with it. On cloudy, rainy days few cows would come in; then, when the weather cleared there would be a sudden increase in the number.

Few, if any, cows or heifers ready for breeding were ever discovered between 10 in the morning and 3 in the afternoon. "That's the time to let your cowboys take a nap," says John Minor.

Both years that Minor has used AI he found about the same number of cows coming in heat on comparable days of the month, with the peak being reached about July 13. It was found that in general the estrus cycle took 19 days. Some freaks would come in on the 14th or 15th day.

BCI

Armour's Beef Cattle Improvement Research, BCI as it is called for short, has become synonymous with AI in the minds of many cattlemen. The primary object of BCI is genetic improvement, however, as Dr. H. J. Hill, director of the program explains. AI is merely a means to that end.

They believe they can move much faster and more economically with AI since they can breed carefully selected, performance tested bulls to many more cows this way. They have their own bull stud and laboratory at Denver. "But if it proves too costly or impractical," says Dr. Hill, "we'll go back to natural breeding."

BCI furnishes semen and a trained inseminator without charge to herds of 600 cows or more on the agreement that Armour has the right to buy the offspring of these matings when the rancher is ready to sell. The selling price may be stipulated in the contract between BCI and the rancher or it may be the market price at the time of sale plus a premium. The rancher is permitted to keep a percentage of the heifers as replacements.

On herds of fewer than 600 cows a nominal fee is charged to partially defray the costs of insemination. In all instances the rancher must provide the riders to detect the cows in heat and bring them to the breeding pens.

Beginning last spring with five herds in Colorado, Montana and Texas, the program got off to a good start. How good will only be known when the calves hit the ground.

In the meantime, Dr. Hill, like many another researcher in this field, has been contemplating the possibility of controlling estrus in cow herds.

"There are two approaches to this," he explains. "The one is to delay estrus by hormone treatment. When the treatment wears off all the cows come in heat simultaneously. The only catch is many of them are then infertile.

"The other approach is to let the cows go through a normal cycle for 30 days after calving, then treat all that have not come in heat in that time with a hormone like stilbestrol to induce estrus."

The idea, of course, is to shorten the period required to inseminate the herd and to produce a calf crop of extremely uniform age.

Dr. Hill, like most others who have watched the interest develop in AI on the range, feels that such a program must be considered as complementary to a well-managed natural breeding program. As an auxiliary tool it opens new doors to progress.

Any rancher seriously considering using AI would do well to review the pros and cons on the matter.

Those who take a dim view of AI on the range stress these points: (1) It is too costly. A man with a small herd can use a $600 bull on 30 cows for two years, then sell him for $300. Cost per service, $5. Cost of AI, when equipment, technician's fees, etc., are all considered may run much more. (2) Only under optimum conditions does the percentage calf crop run as high as with natural breeding. Some claim that one calf crop in five is lost with AI. (3) While AI can greatly widen the genetic influence of outstanding sires it can also backfire and multiply the effects of undesirable characteristics.

On the credit side are these factors: (1) The opportunity to get calves from the best bulls money can buy and to build up a better, more uniform cow herd. (2) More uniform calf crops resulting from more calves from a single sire. (3) A more concentrated calving season. (4) Greater average age of calf crop, thus greater total beef yield from the herd. (5) Reduction in breeding costs through fifty per cent or more reduction in breeding bulls. (6) A better managed herd and a more accurate appraisal of the breeding herd brought about by daily observation during the insemination period.

Even its most enthusiastic supporters admit that it can only work on a ranch that has the proper physical set-up and in the hands of a man who will give it precise and detailed management.

It pays the good manager a premium. As Harry Hargrave, of the Lethbridge Experiment Station sums it up: "AI throws the responsibility on the man rather than on the bull. Any rancher who wants to start such a program must realize that he is taking on a seven-day a week job, rain or shine, that is going to last for at least two months. If he is willing to accept such an assignment he is over the first hurdle."

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(*Continued from page 75*)

farmer realizes young, fast-growing grasses and legumes make the best forage. Everyone is aware grass or legumes in full bloom or later are past their best feeding value. Blossoms in baled hay or fermented silages are readily recognized. Lack of leaves in hay suggests late harvest, while loose leaves are a sign of overdrying. Coarse stems usually mean too old a crop. Alfalfa hay, cut at the right age and properly preserved is bright green, and clover hay is dark green. Timothy and other grasses become lighter in color in haymaking. They weather or bleach to still lighter colors; legumes turn brown in field weathering. Grassy hays can be quickly checked. If cut at the proper time, a grass stem pulled apart will be black at the part of the stem just above a node. Mixed spots of green or brown in a bale mean the hay was unevenly weathered in the windrow. General browning of hay is often from cutting when too old. "Tobacco brown" hay comes from overheating of forage in a mow.

Good hay and good silage are soft to the touch, seldom harsh. Good hay smells good and is dust-free. Most hay should smell sweet though the odors of good hays vary. Top quality grass silage smells like the meadow. Some good silages have the flavor of sharp cheeses. There are other useful silages, though of lower quality, which have the odor of new leather. Silage with the odor and flavor of sweaty harness leather is less likely to be good; animals must learn to like it. The really poor silages are the fishy-smelling kinds. In general, the poorer the grass silage, the more persistent the odor on clothing or hands. If you wash after handling good silage, the odor washes off; after handling poor silage, it must wear off. The odor of corn silage resembles spicy pickles made in vinegar and sugar.

Next, in gauging forage quality comes palatability. In general, high palatability and high nutritive value go together. Let the cow do the testing.

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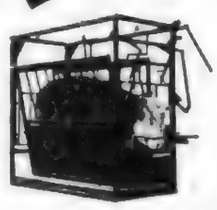

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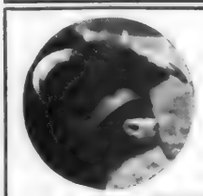
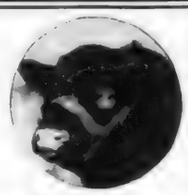


FOR GREATER BEEF CATTLE PROFIT



Here is what a SHORTHORN or POLLED SHORTHORN (naturally hornless) bull can do to increase beef herd efficiency:
***increase* weaning weights 50 to 100 pounds . . . *increase* calf crops 10 to 15 per cent . . . *increase* yearling weights 100 to 200 pounds . . . *increase* mature cow weights 100 to 200 pounds . . . *increase* grazing efficiency and traveling ability . . . *increase* milk in replacement cows . . . *increase* resistance to heat, cold, pink-eye, cancer eye and other infections . . . *increase* carcass value . . . and finally, *increase* market returns by bringing higher prices for weight.**
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Palatability of hay steadily decreases as the crop grows older; palatibility of silage rises with rise in drymatter up to a point, then it declines.

A Little Costlier, a Lot Better

Having recognized your hay or silage at times to be less than the best, what do you do about it? Good hay can always be imported if you look far enough. At $28.25 a ton for good hay, the cost of the nutrients in it is the same as those in earcorn at $40 per ton ($1.40 a bushel). The present price of soybean oil meal is $82 per ton. On this same basis of value for nutrients, a ton of hay is worth $46.10 compared with today's soybean meal.

The tables in Morrison made the above computations possible. They are among the most useful guides a feeder has showing feed composition by protein, carbohydrate, fat, fiber and total digestible nutrients. The protein and total digestible nutrients are of primary concern. But buying enough protein will not settle everything. Hit or miss use of expensive protein supplements to replace good forage is a sure way to waste money while endangering animal health.

Harvey Born has taken a few analyses from the tables. Corn and grass silages of varying quality, along with mixed hay also of varying quality, are his regular roughages. He usually has corn and oats on hand, with wheat and barley at times.

"Feeding right," Born said, "makes the difference between profit and loss. Weight of feed eaten is one thing. The qualities of the feeds are more important. Using tables of analyses is the only reasonably dependable method of making up a good ration with the feeds on hand.

"Like a lot of other farmers, this year we were lucky enough to have a good season for making corn silage. We've got a bunker full of it, but I'm saving that for later. First, I have to work off the second grade, too wet grass silage we made. I'd rather have the crops too wet than too old, and I'd rather have an early cut hay with rain on it than late-cut hay that escaped rain after cutting.

"Out of 10,000 bales we put up," Born continued, "only about 15 or 20 loads didn't get rained on. The answer for us is to mix the roughages—good hay, poor hay, and fair grass silage. Here's how we do it so the cows can't sort anything out. We pull our self-unloading wagon and the forage chopper to the hay barn. We throw one bale of good hay in the forage chopper for every four or five poor bales, covering the wagon about a foot deep. Then the grass silage is put on top and they are well mixed as the wagon is mechanically unloaded into feed bunks. Grain is hand fed in the milking parlor according to each cow's milk production.

"We know how much the bales of hay weigh, and we know how much silage the wagon holds on top of the hay. Average intake of the mixture is easily figured.

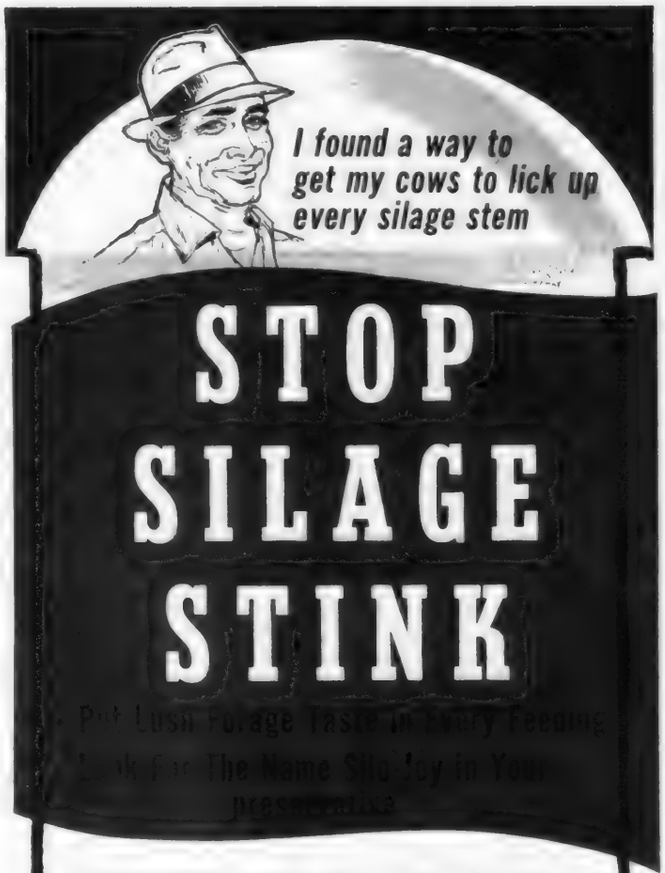
"The feed tables give the total drymatter, the protein and the total digestible nutrients. The tables also tell how much the animals need."

One of Morrison's tables, for example, shows Born that a 1000-pound cow making 40 pounds of milk a day needs 2.6 pounds of digestible protein and 20.7 pounds of total digestible nutrients (TDN) in her daily ration. From another table, he can show 10 pounds of good alfalfa hay provide 5.27 pounds TDN, of which 1.27 pounds are digestible protein. Ten pounds of poor hay has 4.60 pounds TDN including 0.81 pounds of digestible protein. A 60-pound feeding of good corn silage contains more than 40 pounds of water, but it also contains 12 pounds of TDN of which 0.78 pounds are digestible protein.

In 2 pounds of the good hay and 10 pounds of the poor hay and 60 pounds of the corn silage, the TDN content would be 17.65 pounds and the digestible protein 1.84 pounds. The cow on this ration needs no more than 5 pounds of a mixture of 5 parts by weight earcorn to one of soybean oil meal for maintenance and production.

Many other combinations of silages, hay and concentrates are possible. The illustration given here *is in no way intended to be a recommended ration.*

Mixing good or poor hay with another feed is one way to increase nutrient intake. Good hay and corn silage are particularly good for improving palatability of mixtures.


I found a way to get my cows to lick up every silage stem
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Put Lush Forage Taste in Every Feeding
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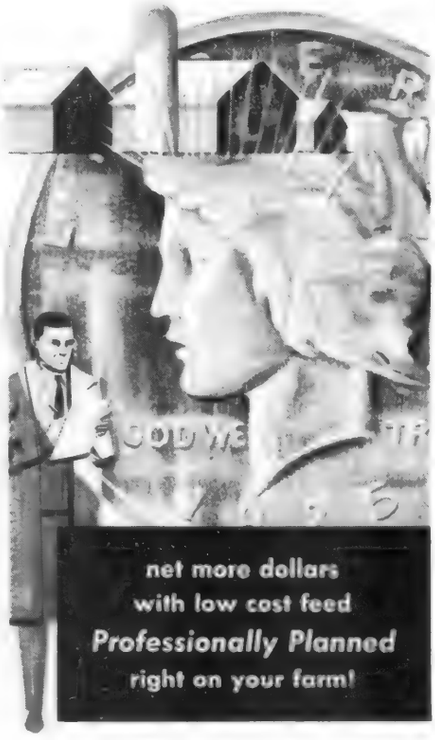
■ Today's animal husbandryman demands two things from his feeding program. He wants feed to promote growth, production and reproduction . . . and to correct and prevent the increasingly prevalent nutritional disorders that often spell the difference between profit and loss. Every farm presents a different problem. Your own feeding program should be professionally planned, on your farm, by your veterinarian. He knows your stock . . . your methods . . . your conditions and the nutritional values of your crops. That is why *only* veterinarians are trusted to prescribe and supply Vitamineral supplements for all livestock and poultry . . . providing up to 22 essential minerals, trace elements, vitamins and antibiotics often absent or deficient in local feeds. Talk to your veterinarian now. He'll show you how Vitamineral supplements can let you use low-cost local crops for the most profit-making ration you can feed.



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Another means of getting animals to eat is to stimulate them by sounds or motions having to do with feeding or milking. Rattling milk cans, driving past the bunk with the feed wagon, starting the machinery for taking silage out of the silos calls the cows to dinner.

Fresh feed that hasn't been slobbered over tastes better than stuff in the bunk a long time. Wet silage loses quality fast on exposure. Frequent feeding of silage or hay by hand is hard work unless you do it mechanically, but any time you are struggling to use up poor forages you pay either in work or money for the economy.

Just as wet grass can be wilted in the field, or can be fortified at the time of ensiling by the addition of ground grain, so can wet silages be enriched at feeding time. About 125 to 175 pounds of grain per ton of crop will much improve a grass silage. This much will increase the drymatter by about 3 per cent and will improve the flavor.

Another trick to get cattle to eat more silage is practiced by a cattle feeder near Hudson, Iowa. He chops the best hay he can buy into a "tank" where he mixes 700 to 800 pounds of blackstrap molasses with each ton of hay. For each animal he mixes 2 to 3 pounds of the molasses hay with as much corn silage as it will eat, starting with about 20 pounds per head. As the feeders grow he increases the corn silage and adjusts the supplements of protein and grain.

The mixing of corn silage with grass silage, each good, bad, or indifferent in quality, has advantages much like those of adding grain to grass silage. The corn silage adds palatability and carbohydrates, and the grass silage gives protein. Feeding one kind of silage until it runs out, then feeding the other kind, is poor practice. With a change of feed any animal has to shift his digestive gears. To get all the good from different kinds of silages, different kinds of bacteria must establish in the rumen. Do not mix high protein supplements with forages for dairy cows. By so doing, you may be penalizing some cows and giving others too much.

Adding molasses is an old remedy to "improve" poor hay. It is of course a crutch to use with a withered leg. When applied by hand the blackstrap molasses is usually diluted with twice its volume of water. It may be sprayed or sprinkled on the hay when fed. The molasses adds tastiness as well as quickly digestible carbohydrates and some minerals.

The old idea of salting poor hay to increase palatability is sometimes used. Salty water is best. About 5 pounds (pints) dissolved in 5 quarts of water may be sprinkled on a ton of baled hay shortly before use. The salt adds no nutrients, however.

Neither do special flavor additives. Their purpose is to improve the flavor. "Silo-Joy," one of the flavorous additives, can be added to silage when it is made or later when it is fed. It can also be used on hay at feeding time. Dissolved in water for sprinkling on forage at feeding time, the compound im-

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proves flavor. A pound, costing around 85 cents, is used per ton of forage. The product is concentrated oils from many plants. These additives have been very successful.

There are several general facts about roughages which are fairly constant. First, a farmer can assume winter hay in the barn will contain less than 20 per cent moisture. Of 100 pounds fed, slightly over 80 pounds will be drymatter. Good silage runs about 30 per cent drymatter, average grass silages run 22 to 20 per cent. The biggest fault with grass silage this year is that it was put up too wet. The addition of hay will increase the drymatter and raise the amount of nutrients per mouthful. If good hay is added, the palatability of the silage may be improved as well. The question is "How much hay to use?"

Every silage feeder should know the amount of drymatter he is feeding in his silage. The test is easy. Weighing a sample before and after drying it carefully is all that is necessary. Cooking silage in the house can be socially unsafe for you. To get away from the smell it can be dried outside on a stove or by using heat lamps.

Remove an entire day's feeding from the silo so you're down to wet material. From the surface of silage in the silo, take a 2-pound portion from each 10 square feet of exposed surface. Mix it well, right in the silo. Discard half, then mix again. Continue the mixing and halving until about 10 quarts remain. This is your sample to be taken out of the silo for weighing. Pack tight in a bucket or plastic bag.

Provide a pan or tray about 15 inches by 30 inches, with 2-inch sides. Weigh the pan. Discard the top few inches of silage in the bucket, then spread exactly 6.25 pounds; this is 100 ounces of the moist sample. Dry it and weigh it until there is no loss in weight on two successive weighings. The number of ounces left is the percentage of drymatter in the silage. For example, if it weighs 19 ounces, the silage has 19 per cent drymatter. The weight of the pan, of course, must be subtracted from the fresh and the dried samples.

The second general fact is: about half of the drymatter of good hay, or of most silages, is digestible. Some of this is fiber. Applying the 50-per-cent-digestible factor of digestibility to your feeds may give you a surprise (not always happy). Assume that you feed 10 pounds of decent hay per day, there are 8 pounds of drymatter and only 4 pounds TDN. If you feed 80 pounds of an ordinary grass silage at 25 per cent drymatter, half of which is digestible, your animal gets 10 pounds TDN from the silage. From these 90 pounds of feed it can digest only 14 pounds of nutrients. Moisture content particularly affects the nutrients per pound of feed.

A third fact needs attention: both those feed analyses required by law to be stated on the bags and those given in tables of proximate analyses of feeds show only the crude protein rather than the digestible protein content. It is fair to work on the

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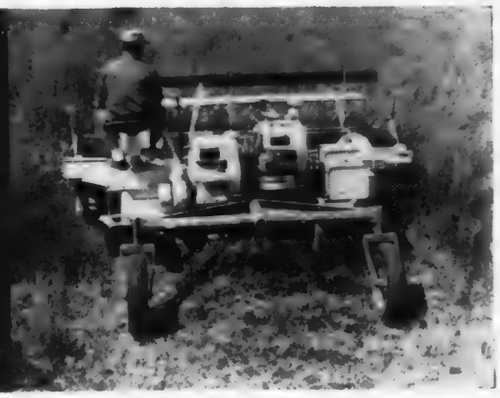
Self-Propelled Windrower-Hay-Conditioner

Handles THREE Haying Jobs . . .

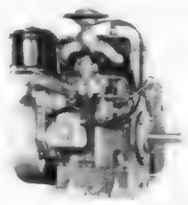


Typifying the new trend in time- and cost-saving farm power equipment is this Self-Propelled Owatonna Windrower and Hay Conditioner unit . . . designed to cut, windrow and condition hay . . . all in a one-pass, one-man operation. It's made by the Owatonna Mfg. Co., Owatonna, Minn.

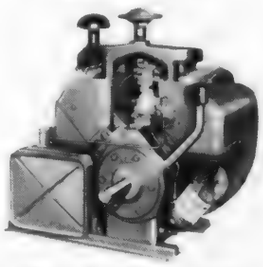
Two Wisconsin Heavy-Duty Air-Cooled Engines provide power for the entire operation. One engine operates the windrower and propels the entire unit. The other engine powers the Hay Conditioner, which is attached to the windrower to form a complete, combination unit. According to the manufacturer, immediate conditioning of hay provides approximately 20% more nutritional value.

Self-propelled Wisconsin-powered equipment permits the greatest possible maneuverability and the best assurance of clean work. The operator sits right on top of the job. He *sees* what he's doing. Operating and maintenance costs are reduced to a minimum. Work is greatly speeded up — labor costs reduced.

This is farm progress — helping to provide a wider spread between operating costs and profit. It will pay you to look into Wisconsin-Powered Self-Propelled Equipment. Confer with your farm implement dealer. And write for Wisconsin Engine Bulletin S-223.



This is the 2-cylinder 18 hp. Model THD Wisconsin Engine that operates the DCA Hay Conditioner.



This is the 4-cylinder, V-type 30 hp. Model VH4 Wisconsin Engine which powers the windrower and is the prime mover for the entire self-propelled unit.

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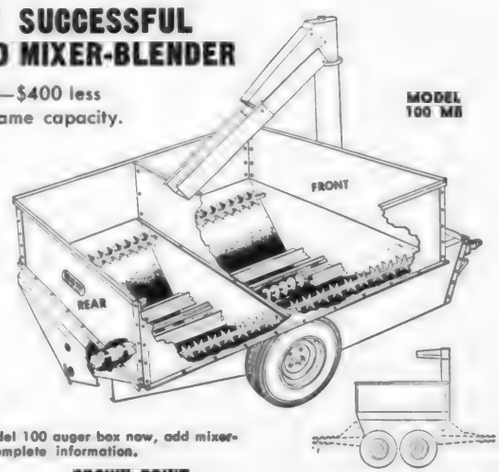

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basis that the higher the percentage of protein the higher its digestibility. One-half to two-thirds of the crude protein in a feed will be digestible.

No one can really blame the weatherman for the 1958 season. In the year ahead it is worth remembering the work required to make good hay and silage is little more, often less, than that needed to make poor quality feeds and the struggle to make them useful in a ration. Farming always gives us another chance!

THE AUTHOR: Dr. Rogers is agricultural consultant to a number of industries. For 34 years he taught and carried on research. His major subject: forage.

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LETTERS

(*Continued from page* 14)

"Pickled Corn" in the FARM QUARTERLY, Autumn issue? I am mighty proud of my 17x50-foot Martin Silo, manufactured by Martin Steel Products Corporation, Mansfield, Ohio. It makes the best wet corn feed possible.

N. S. Heaney

Madison, Wisconsin

Sirs:

I enjoyed your recent article entitled "Pickled Corn" and felt that many worthwhile points were made. However, I got the impression from this article that only a Harvestore or Silver Shield Silo could be used satisfactorily for wet shelled corn storage. Therefore, I want to take this opportunity to write you and express my complete satisfaction with the air-tight, all-steel silo manufactured by the Martin Steel Products Corporation, Mansfield, Ohio.

My 15x44-foot Martin Silo produces top quality wet corn feed without any trace of spoilage.

Ervin M. Tuschen

Sun Prairie, Wisconsin

The Dam Engineers

Sirs:

Your article, "Little Dams Stop Big Floods," in the current issue of THE FARM QUARTERLY is the finest article on the subject that I have read. The publishing of this article is an important public service, and it is just too bad that it cannot be read by every adult citizen of our country, as well as every high school student.

There is an enterprise of "Big Dam Foolishness" now in process of consideration, I think by the Slide Rule Boys of the Honorable, Respectable, and tremendously Profligate Corps of Army Engineers. They intend to erect, I think, three towering dams in my old homeland in northern Indiana for the purpose of flood control of the Upper Wabash Valley, with the attending production, no doubt, of power that such impoundments would afford. The time would come, however, when the reservoirs would become filled with silt in that clay soil, when of course they would provide neither power nor flood control.

Perhaps I am guilty of "blasphemy" against the Ancient and Honorable Corps, but I know that I am stating the truth about many of their works of the past in the field of dam building.

Let me state in justice to the Corps, that they have done many fine jobs, but few in the field of flood control, on a permanent and lasting basis. Let them stick to their true province of ARMY ENGINEERING.

Sylvester Huston

Sturgis, Michigan

Nevada Milk

Sirs:

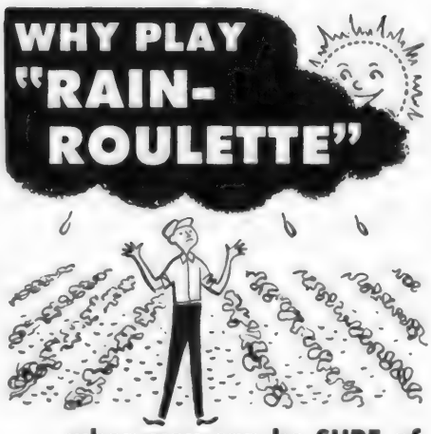
I think you acted in haste printing conditions concerning how milk is produced in Nevada ("Contract Milking," Summer, 1958). As one of the larger producers of Grade A milk in Nevada, I can truthfully say we are one of the strictest in our laws and regulations that I know of.

Utah has some fine dairy barns and good cows but on the average they do not compare with our dairy barns or cows.

I think apologies are in order in your next issue.

Leo P. Bergin, Jr.

Fallon, Nevada



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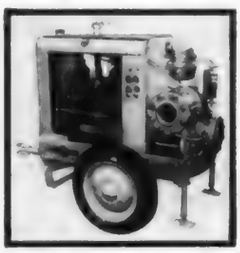

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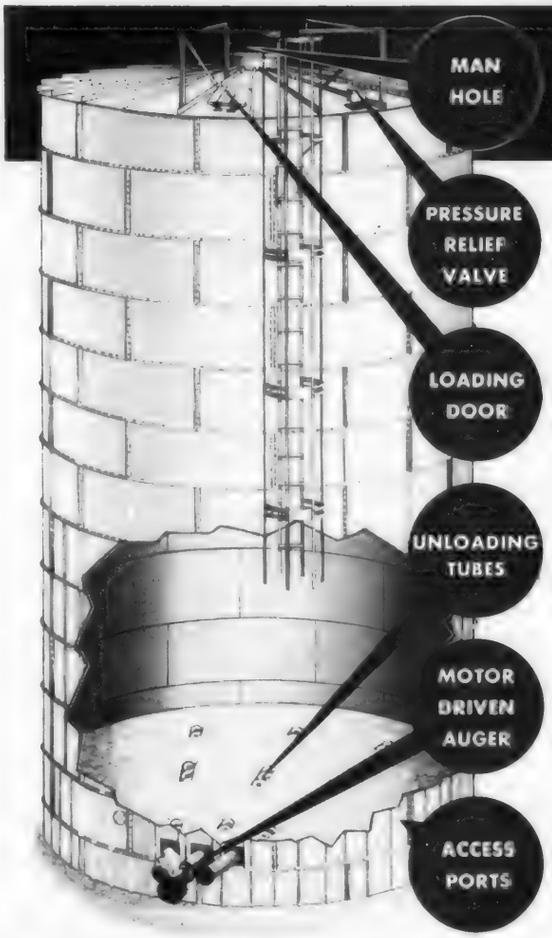

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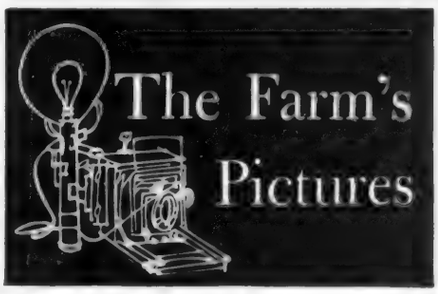

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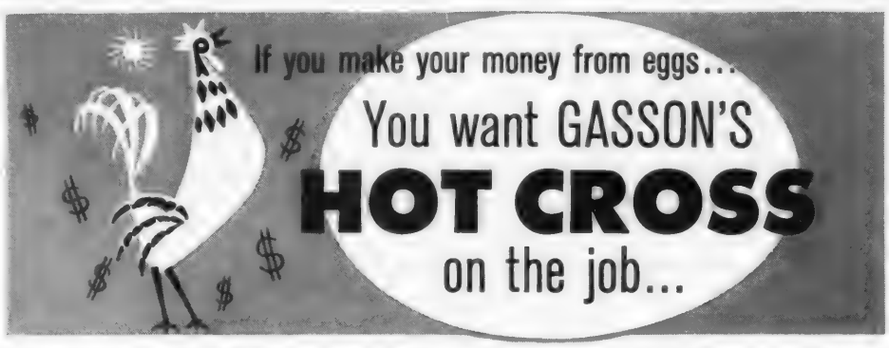
36 thru 41—R. J. McGinnis. 42 and 43—Chart by Charles R. Koch. 44—Charles R. Koch. 45—Ray Manley from Shostal. 46—Joe Munroe; Richard P. Klein from Foto/Find. 48—Mack Derick. 49—Charles R. Koch. 50—Mack Derick. 51—Charles R. Koch. 52 thru 55—Edwin Van Auken. 56—Fred Knoop. 58—Western Beet Sugar Producers Assn. 59—Joe Munroe. 60—Farmers & Mnfgrs. Beet Sugar Assn.; (bottom) Joe Munroe. 61—Joe Munroe. 62 thru 65—Robert B. Goodman. 66—J. C. Allen and Son. 67—Chart by Prof. C. E. French, Purdue. 68 thru 71—Charts by Fred Eichenberger. 72 and 73—The Bettmann Archive. 74—Kazik Pazovski. 75—Paul Cooley. 76 thru 78—Conrad Oliven. 79—Chart by Fred Eichenberger.

THE DAIRY BARN

(*Continued from page* 16)

"If you give a cow free choice of long hay, she'll correct this for herself," Dr. Tyznik said. "She will always eat sufficient long hay to give the bulk necessary to hold the finer ground foods in the rumen until they are acted on by the bacteria. Then roughages will be properly digested and the tests will return to normal."



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(Signed) Frederic B. Knoop, Business Manager.

Sworn to and subscribed before me this 24th day of September, 1958.

(Signed) Clifford Laemmle

(My Commission expires October 5, 1960)

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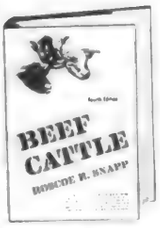

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Allied Mills, Inc. 6
Allis-Chalmers Co. 31
Aluminum Co. of America—Farm Gates 113
American Guernsey Cattle 122
American Hampshire Sheep Ass'n 124
American Shorthorn Ass'n 126
American Society of Farm Mgrs. 102
American Zinc Institute 114
Anchor Serum Co. of Mo. 104
Ariens Company 130
Armco Drainage & Metals Products 97
Automatic Equipment Mfg. Co. 108, 126

Babson Bros. Co. BACK COVER
Badger-Northland Inc. 126
Behlen Mfg. Co. 85
C. S. Bell Co. 118
Belsaw Machinery Co. 98
Belt Corp. 108
C. L. Berger & Sons, Inc. 115
Bostrom-Brady Mfg. Co. 110
N. P. Bowsher Co. Inc. 102
Brady Mfg. Co. 122
Brillion Iron Works Inc. 118
Brower Mfg. Co. 106
Buckeye Incubator Co. 111
Burch Plow Works 92
Butler Mfg. Co. Bldg. Div. 32
Butler Mfg. Co. Farm Equip. Div. 90

Campbell Farm Dryer Co. 112
Campbell Hausfeld Co. 106
J. I. Case Co. 88, 89
Caswell Mfg. Co. 103
Caterpillar Tractor 8
Chore-Boy Div. 17
Clay Equip. Corp. 117, 133
Clayton & Lambert Co. 131
Cobey Corp. 119
Comet Ind. 84
Construction Machinery Co. 130
Continental Motors Corp. 121
Craft Mfg. Co. 115
Ray Cunningham & Sons 19

Dairy Equip. Co. 13
Danuser Machine Co. 120
H. C. Davis & Sons 124
Decker Mfg. Co. 128
John Deere & Co. 1
DeKalb Agricultural Association 24
Deming Co. 105
Direct Gallery (Paintings) 114
Doane Agricultural Service Inc. 123
Dodge Div. Chrysler Corp. Trucks 12
Duplex Mill & Mfg. Co. 108
E. I. DuPont De Nemours & Co. Inc. 94

Eaton Mfg. Co. 30
Electric Auto-Lite (Spark Plugs) 82
Ewing Foundry 16

Fairbanks-Morse Co. 100
Farmhand Co. 101
Farm Quarterly Book Ad 132
Farnman Co. 118
Ferndale Farms 103
Earl Ferris Nursery 98
Firestone Tire & Rubber Co. 9
Fitchburg Eng. Corp. 18
Flavor Corp. 127
Webber C. French Mfg. Co. 104

Gasson's Poultry Farms 124
Gehl Bros. Mfg. Co. 125
The B. F. Goodrich Co. 7
The Goodyear Tire & Rubber Co. 2nd Cover
Gorman-Rupp Co. 25
Gravely Motor Plow Co. 122

Haban Mfg. Co. 128
Hahn Inc. 83
Hale Fire Pump Co. 111
Hampshire Swine Registry 122
Jos. Harris Co. Inc. 130
Hartzell Propeller Fan Co. 117
Heil Co. 123
Heisdorf & Nelson Farms Inc. 29

Helix Corp. 129
Hobart Bros. Co. 98
Hoffco, Inc. 84
Holstein-Friesian Association 128
Howard Rotovator Co. 98

Inland Steel Products 109
Insemikit Co. Inc. 124
International Harvester Co. (Truck Div.) 2, 3

James Mfg. Co. 91
Johnston Pump Co. 99

Kilby Steel Corp. 104
Knibb Industries, Inc. 102
Knight Mfg. Co. 96
Koppers Co. Wood Div. 124

Lakeshore Mfg. Co. 131
Letz Mfg. Co. 106
Lilliston Implement Co. 115
Loudon Machinery Co. 88
Lowrance Quail Farm 120

M & W Tractor Prod. Co. 27
Martin Steel Corp. 2nd Cover
Massey-Ferguson Inc. 20, 21, 22, 23
Mayrath Co. Inc. 105
McCulloch Motors Co. 86
McDowell Co. 120
McGinness Bros. Ranch. 28
Meyer Mfg. Co. 119
Mueller Brass Co. 28
Musser Forest Inc. 16

National Agricultural Supply Co. 122
National Band & Tag Co. 126
National Rainbird Eng. & Sales Co. 110
N. W. Naylor Co. 108
New Holland Machine Co. 33
New Idea Div. Avco Mfg. Corp. 10, 11
North American Mfg. Co. 106
Noba Inc. 124
Nutritional Research 94

Olentangy Farms 124
Oliver Corp. 5

Papec Machine Co. 81
Paul Mfg. Co. 102
Pax Steel Co. 102
Peerless Pump Div. 14
Pfister Associated Growers 98
Charles Pfizer Co. Inc. 34, 35
Pioneer Hi-Bred Corn Co. 122
Piper Aircraft Corp. 15

Ralston Purina Co. 81
Red Poll Cattle Club of America 114
Ridge Tool Co. 96
Rilco Laminated Products Inc. 107, 116
Ritchie Mfg. Co. 104
Roper Mfg. Co. 106

Sioux Steel Co. 126
Snow Co. 93
Spohn Medical Co. 117
Spray-Con Sales Co. 114
E. R. Squibb & Sons 4
Stark Bros. Nurseries 110
Stollers Seeds 110
Stran-Steel Corp 80
Sudbury Laboratories 87
Sunflower Industries 83
Sunset Equipment Co. 84

Tokheim Oil Tank & Pump Co. 88

U. S. Publishing Co. 134
U.S. Steel-National Tube Div. 26

Visking Co. 110
Vitamineral Products Co. 128
Vulcan Hart Mfg. Co. 122

W-W Cattle Chute Co. 126
W-W Grinder Corp. 120
Western Land Roller Co. 96
Wheel Horse Products Co. 112
Wilson Refrigeration Inc. 126
Wisconsin Motor Corp. 129
Yardley Plastics Co. 95

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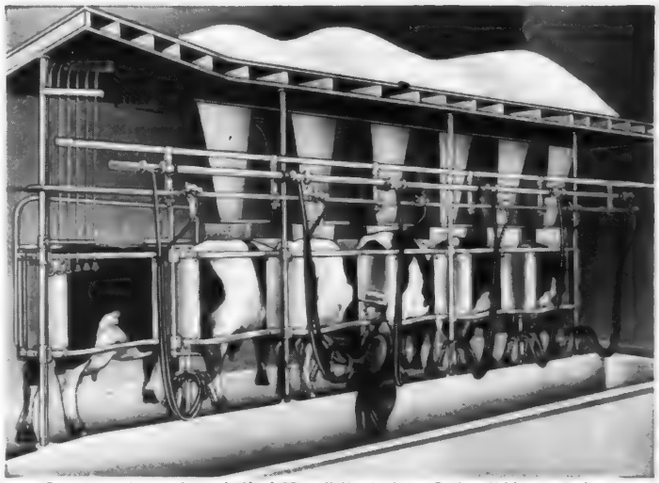


Cut-away picture shows half of 12-stall Herringbone Parlor. Udders are about 3 ft. apart. Cables release an accurately measured portion of feed for each cow.

Facts on the new Herringbone Stalls

How to pick the right milking parlor for your herd

You'll probably install a modern parlor within the next few years.

This means you must decide *which* type is best for your particular operation. Here are facts which will help you make the right decision.

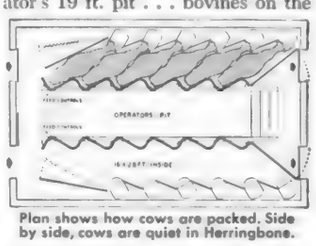
There are 3 basic types of milking parlor stalls which permit fast, efficient, no-stoop milking.

First to be developed was the Gate-type stall. Next the tandem Walk-thru stall and now, the Herringbone system which has stirred so much excitement since its introduction from New Zealand last year.

The "cow-a-minute" Herringbone . . . A skilled, fast operator will milk *and feed* 60 cows an hour in a 12-stall Herringbone parlor, but 55 an hour is a better rate for the average man.

Two features make this possible. First, with the usual 12-stall Herringbone parlor, 6 cows enter and leave at a time. This doesn't take much longer than the time needed for 2 cows to enter and leave a Walk-thru stall. Cows move better in groups, and there's far less opening and closing of doors and gates than with other type parlors.

Also, the diagonal Herringbone system allows 12 cows to be closely packed along the sides of the operator's 19 ft. pit . . . bovines on the



Plan shows how cows are packed. Side by side, cows are quiet in Herringbone.

bias. This is possible because the neck of one fits naturally against the belly of the next. (See diagram above.) Not only does this close packing save the operator many steps, but cows like the close fitting . . . each stall takes only ⅔ as much floor space as a Gate-stall and only ⅝ as much as a tandem Walk-thru stall . . . and cost per stall is substantially less.

Advantages of Gate-type Stalls . . . Gate-type stalls are ideal for letting you give personal attention to individual cows . . . for example, high producers or slow milkers . . . because only one enters at a time. They also offer a good opportunity to show a fine animal. Thus, they are a good choice for the farmer with top producers or who sells breeding stock.

However, Gate-type parlors cost more per stall since they require heavy gates in the rear and almost 100 sq. ft. of floor per stall.

Walk-thru Stalls for most herds . . . Walk-thru parlors let 2 or 3 cows enter at a time and cost less than Gate-type stalls. This is mainly because they need no rear gates or rear alley and the building can be much smaller. In general, Walk-thru parlors are the best and most economical choice for most farmers with medium size herds.

Clay Herringbone Features

1. Much heavier frame at rear. Posts to ceiling permit attachment of cross member to carry air, water, and milk line.

2. Feed is supplied from overhead through non-clogging chute. Up to 1400 lbs. of feed is available for each stall.

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5. No floor attachments are located under feeders. This makes washing out easier. Posts have stainless steel sleeves at the point where they enter cement.

6. Galvanized finish cleans easily; needs no repainting.

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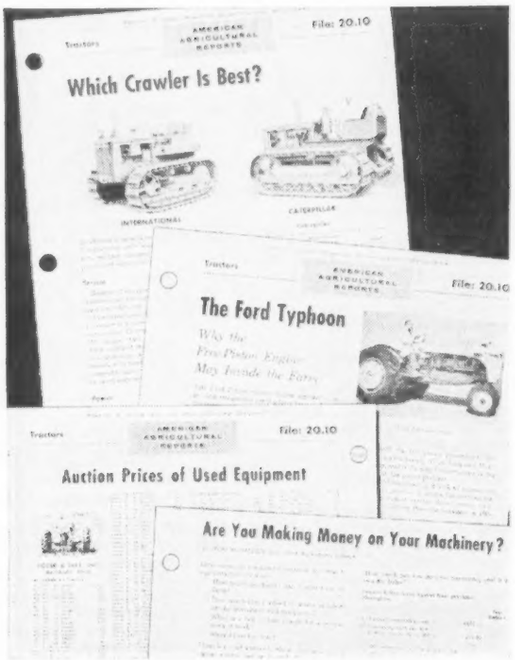
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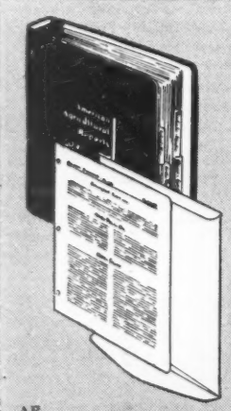

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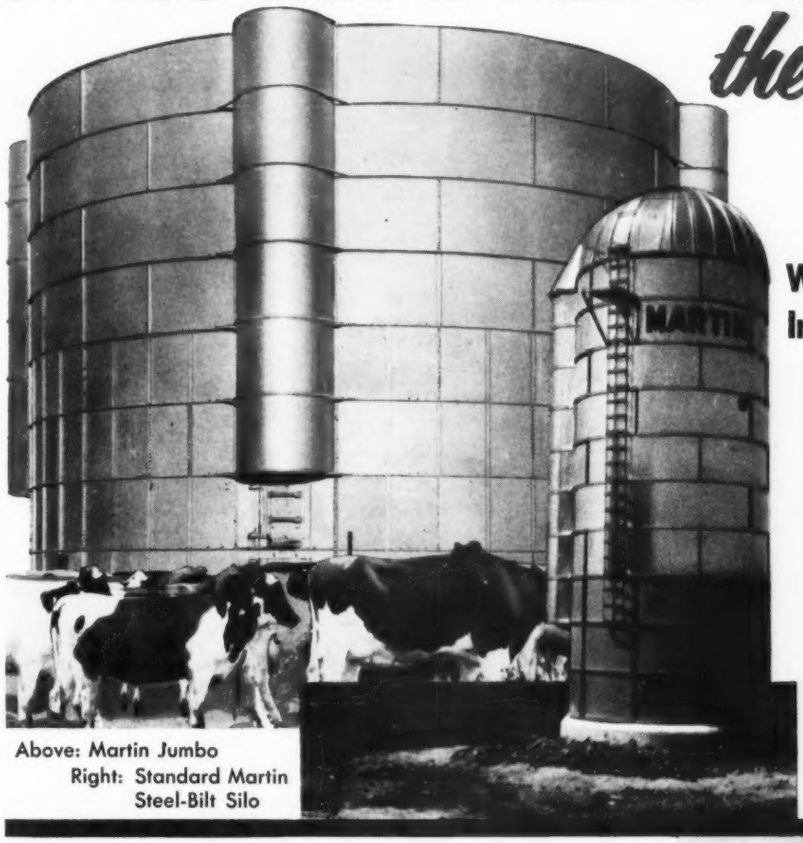

Above: Martin Jumbo
Right: Standard Martin Steel-Bilt Silo

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Will Cut Your Labor Costs in Half— Increase the Value of Your Crops 25%

The key to a profitable beef or dairy feeding program is the use of a heavier ration of good quality silage. You can get more totally digestable nutrient from an acre—and slash labor costs in both handling and feeding to put more cash in your pocket. MARTIN Jumbo user Lawrence Begg, of Columbus Grove, Ohio, says that 15 minutes pitching morning and evening puts around-the-clock, free choice silage before 60 Holsteins. "With our MARTIN Jumbo we've solved the problem of saving time and work in feeding silage," says his herdsman, Lyle Graham. Regular or Jumbo, MARTIN Steel-Bilt Silos give proper fermentation for better quality, succulent, palatable silage.

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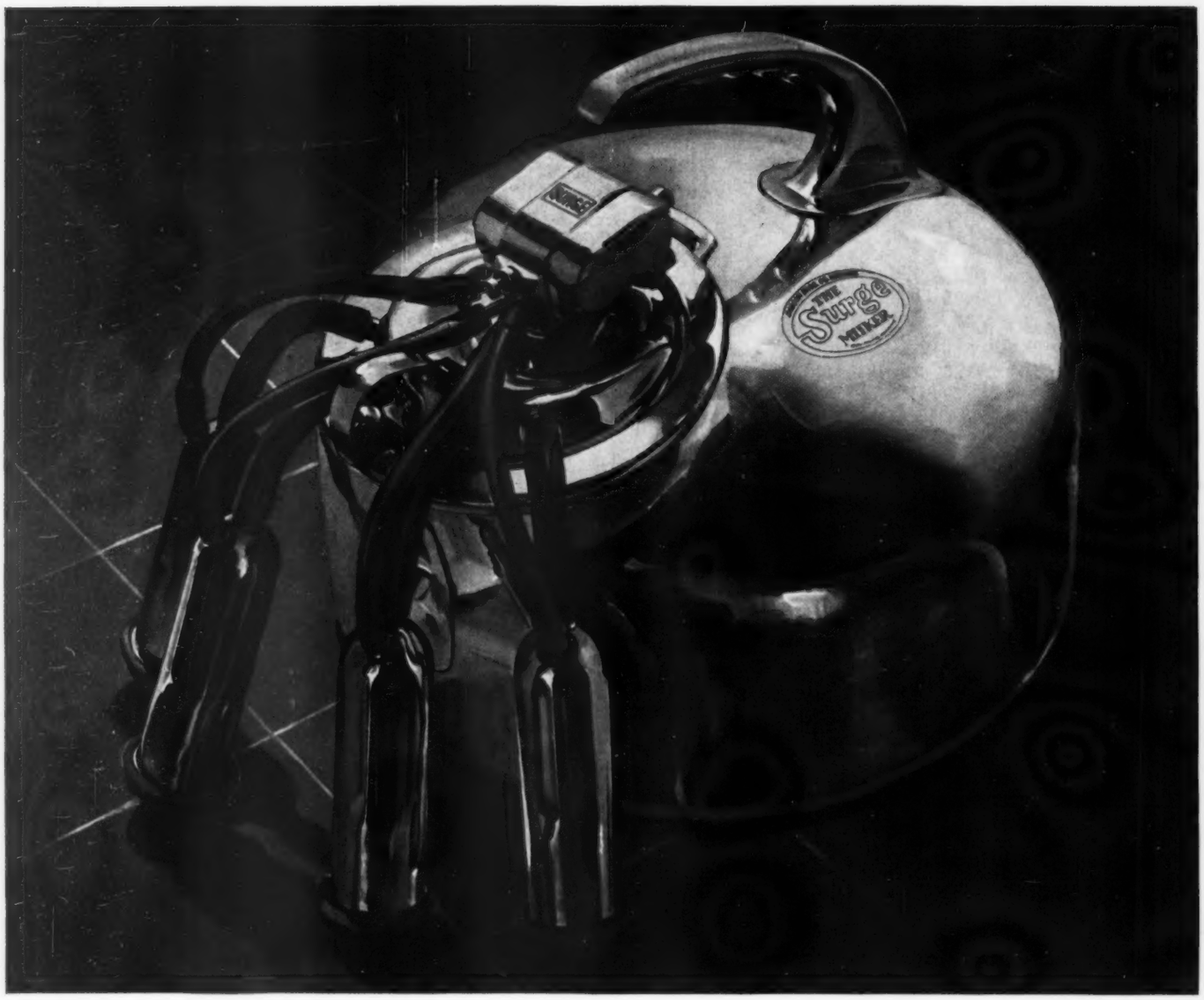

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